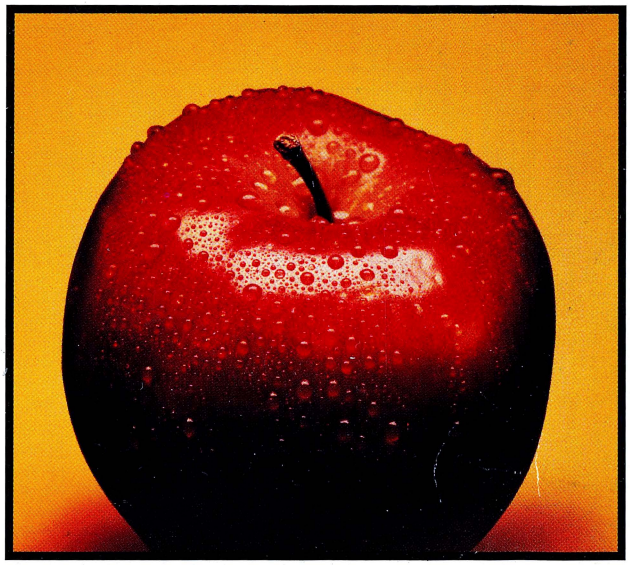
The Book of

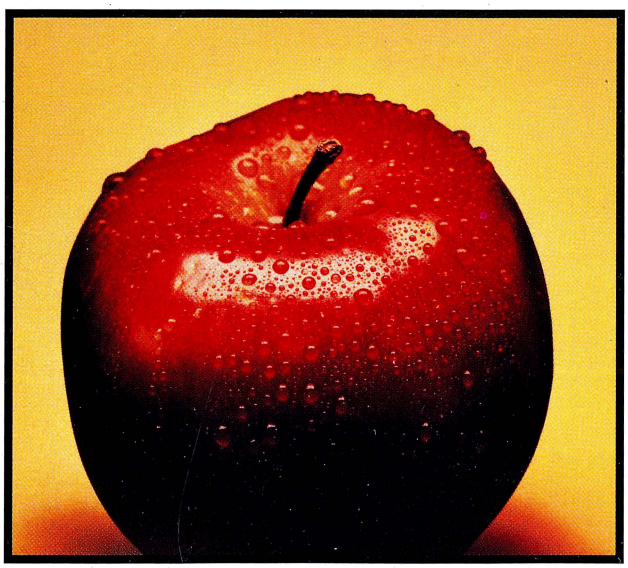
APPLE SOFTWARE

6TH EDITION

Edited by

JEFFREY STANTON, MIA McCROSKEY, and MICHAEL MELLIN





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THE BOOK OF APPLE SOFTWARE

Sixth Edition

Edited By
Jeffrey Stanton, Michael Mellin, and Mia McCroskey

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INTRODUCTION

The Company

Apple Computer is a young company by corporate standards, but it's one of the granddaddys of the fledgling microcomputer industry. And lately it's been going through some serious changes. In the past nine months the company founded by Steve Wozniak and Steve Jobs in 1977 has experienced poor sales for the first time, been reorganized, laid off twenty percent of its employees, and seen Wozniak resign and Jobs first stripped of his managerial powers, and then resign his chairmanship. The company which, in it's youth, seemed to have the Midas touch, has reached a critical turning point. Like the rest of the microcomputer industry, it's feeling the need to tighten its belt and streamline operations.

Theories and rumors concerning the future from within the company and the industry vary widely. With both Wozniak and Jobs gone from everyday operations, some say the company's spirit is broken. Others—including, of course, Apple's current management—say the recent reorganization was necessary to save the company. While a corporate flow chart of a year ago would have had the best project manager gnashing his teeth, the company's organization has now taken on a more traditional form. Instead of two development factions—Apple II and Macintosh—each with their own ideas about marketing, R and D, and so forth, all the apples are now in one basket. With much less duplicated effort and crossed wires, things are bound to run more smoothly. Sales, and, more importantly, profits, will be the best gauge of the success of the new regimen. While things have been rough over the past year, it's too early yet to judge the financial results of the changes.

The People

As for Wozniak and Jobs, the most famous *wunderkind* of the microcomputer industry, they seem to be ready to cut the apron strings. Indeed, Wozniak had already left Apple once (to produce the not-so-profitable US Concerts, among other things) before rejoining the Apple II development team. Jobs, who maintained control of the Macintosh division until he resigned in late May, 1985, and was chairman of the board until he gave up that office in mid-September, has sold approximately $21 million worth of Apple stock since July. Even so, he remains the major stockholder, with nine percent of the company's 61.8 million shares (he can't sell any more until early 1986). All that cash isn't just mad money, however. Jobs apparently plans to use it to form a new company that will build a powerful computer workstation for universities. Initially, Apple's board of directors talked investing in the new company, until Jobs informed them that he'd lured away five important Apple employees. Indeed, Jobs seems to have little compunction about burning bridges behind him. Now, remaining Apple executives are quick to point out that he cannot use any Apple technology in his new venture, and they seem concerned that their former leader is about to become the competition in the coveted educational market. Jobs' five recruits are three marketing specialists and two engineers—including Apple's former manager of educational marketing—certainly an excellent founding staff.

The Product

Despite it all, the Apple II series remains a strong part of the Apple empire (which, with something like $190 million in the bank, isn't too likely to crumble). It has a reputation as a versatile, reliable, workhorse. Embraced by everyone from hackers to businessmen, it has a large, loyal user base.

Starting in the fall of 1985—close on the heels of Steve Jobs' resignation—Apple announced several new products for the IIe and IIc, as well as further development projects for the Macintosh. A 3½ inch disk drive for the IIc, along with software products converted from 5¼ inch format to run on it, a one megabyte RAM upgrade board for the IIe, and a color ImageWriter for all Apples lead the new product announcements. Among the most exciting developments for IIe/IIc owners are the

sixteen-bit CPU upgrades being offered by outside vendors. The sixteen-bit IIe or IIc will be faster and more efficient, and the upgrades can include extra RAM. Many software and hardware companies are well on their way to releasing new products to go with the sixteen-bit system, including well-established AST.

Outside vendors show no sign of discontinuing Apple II series software development. The Apple II remains the computer of choice for schools, and Apple has displayed renewed interest in the educational market. In addition, the Apple II is virtually unchallenged in many vertical markets such as farm and medical office management. Apple may be reassessing its niche in the industry, but one thing is clear: it isn't going to neglect the II line.

The Book

This sixth edition of *The Book of Apple Software* is our biggest book ever. We've taken extra care to update reviews of older products and include the most recent new software possible. We feel that the structure of the book is an accurate reflection of the Apple II software market. For example, Apple's strong educational tradition is indicated by the size of the Education section, and the organization of our new Productivity section better reflects the way people use computers in the office and at home.

We've designed The Book of Apple Software to be clearly informative and pleasant to read. The reviews are aedited for consistency and accuracy. We do not review demonstration versions or, in most cases, pre-release packages, and the vendors do not have any editorial control over the reviews. In most cases, the vendor does not even see the review before publication.

The book is divided into several general sections which should make sense to the average Apple user. We've subdivided even further when it's seemed appropriate—Entertainment into arcade, adventure, board games, etc., for example—and arranged titles in alphabetical order. As a further convenience, every title is included in the alphabetical index in the back of the book.

Each review includes product information, evaluative grades, and hardware and software requirements. The grades are tailored for each section, so look for specialized ratings like Educational Value in the education section and Challenge in games. Icons at the end of each review represent the appropriate hardware configuration to run the program (see "The Icons" following this introduction for a definition of each).

Our goal is to help you select the software that best suits your needs by providing fair, unbiased reviews of as many programs as possible. While members of our staff have spent months contacting vendors and sending software to reviewers, this book does not contain every program available for the Apple. Deadlines, uncooperative vendors, and simple lack of knowledge about some packages prevent us from acquiring and reviewing everything. However, we do include most of the available Apple software, and more importantly, all the major programs. If you produce, or know of, an Apple program that we have not included, please feel free to contact us at the address at the end of this introduction.

We do not sell the software reviewed here. If you want to buy a reviewed package, look for it at your local software store or contact the vendor directly. The addresses on the vendors list at the back of the book were accurate at press time. Unfortunately, software vendors seem to move more frequently than jackrabbits, so we can only hope the addresses we've printed will lead you to the vendor you need. The same caution applies to prices and technical information. We cannot make the vendors stick to their prices, or keep them from revising their programs. While most of the reviews will remain correct, you should double-check this information if it makes a difference in your purchase.

—Mia McCroskey

The Reviewers

The reviews in this book are complete, evaluative reports about the software written by experienced Apple users. Our reviewers are a diverse lot—ranging from professional writers to engineers—and each reviews the types of software he knows best. Programmers review languages, businessmen review spreadsheets, accountants review accounting systems, and so forth. They test the software in their working environment whenever possible. Many have friends, spouses, chidren, students, and co-workers who contribute further opinions. The reviewers live all across the United States, and none are closely affiliated with any one software developer.

We are grateful for their stalwart attention to detail and diverse insight into the world of Apple software. They have labored many hours to share their knowledge and experience with other Apple owners. Our thanks to:

Don Adams
Steve Adams
Randall Backus
Glenn Bassett
Marjorie Boughan
Vance Bowen
Fred G. Brooks
Michael Brown
Richard Brown
Kurt Bullard
Mary Campbell
Eddie Chang
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George Fontaine
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Jeff Imig
Kass L. Bennett
Gary Kevorkian
John Kostecki
Barry S. Lachman
Thomas W. Laich
Michael Lee
Monty Lee
Mike Livingston
Mary Majors
Janet E. Meizel
Donald Moore
Gene Nacey
Ronald Nocket
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Jeffrey Stanton
Grace Suarez
Jane Suenderman
Stephen Taffee
Mike Tarrani
Alan Thal M.D.
John R. Tkach
Richard Treptow
Patrick Turpin
Douglas Watson
Priscilla Waynant
Dwight Wheeler
Colin Whipple

We welcome potential reviewers to submit a short writing sample and letter explaining their interests and hardware configuration. Software reviewing is strictly voluntary, although, in most cases, the reviewers are allowed to keep the packages they review. If you're interested in becoming a reviewer contact us at the address below.

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The Book of Apple Software
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Van Nuys, CA, 91406

The Criteria

At the top of each review you'll find the program's vial statistics and the grades assigned it by our reviewer. Along with the minimum memory required and models the program runs on, some reviews also include specific software and hardware requirements, such as "Requires *Multiplan*" or "Requires light pen." At the end of each review icons convey basic hardware requirements such as number of disk drives. See "The Icons" following this section for a definition of each icon.

We employ the familiar A through F letter grading system, "A" indicating superior and "F" unacceptable. Games receive a Challenge rating of Easy, Medium, Hard, or Varies. Adventure games are also graded on their vocabulary and the number of game positions you may save on one disk is listed. When two programs, reviewed in the same review, received different grades, the two grades are separated by a slash. The grades, and any other information that varies between them, such as program size or system requirements, are always listed in the same order as the program names in the title. Throughout the book, N/A in place of a letter grade means the catagory is not applicable for that program.

Overall Rating—How the program stacks up against its competition, based on all of its features and its other grades.

Ease of Use—A measurement of the program's "user-friendliness." Takes into consideration how long it takes to learn the program, whether the commands are logically arranged, and whether functions that should be simple are overly complex.

Documentation—An overall grade for the program's supporting text. The grade is based on clarity, completeness, physical presentation, and so on.

Reliability—The program works as it should and doesn't hang inexplicably, destroy data unasked, or flash obscure error messages.

Error Handling—Whether the program deals well with your mistakes. It should tell you what you've done wrong, not freeze or dump you back to the desktop.

Value for Money—Based on its own features and the standards set by the marketplace, a judgement of whether the program is a bargain or overpriced.

Creativity—Is it a new, original game concept, or just a rehash of a tired theme?

Challenge—How much effort it takes the average player to win the game.

Vocabulary—Adventure games should understand simple sentences, a variety of synonyms, and a wide range of verbs.

Save/Restore—The number of saved game positions you can store on one disk at one time. The symbol ∞ means the number depends on the complexity of the game, but is generally quite high.

The following two grades are represented graphically, with mortar boards for Educational Value in the Education section and palletes for graphics in the graphics section.

Educational Value—How well the program fits into a curriculum or supplements a course of study. Whether it effectively covers the intended subject, and whether what it teaches is best taught by a computer. One to five scale; five is best.

Graphics—Whether they're clear, artistically done, and make the best of the Apple's color capabilities, or might as well be displayed on a portable TV. One to five scale, five being best.

The Icons

The program comes on disk, and one drive is required

The program comes on a copy-protected disk

The program comes on cassette

Two disk drives required

Joystick required

Paddles required

Track ball required

Mouse required

Color monitor, or color graphics adapter, required

Printer required

80-column printer required

132-column printer required

Plotter required

Modem required

Solid icons (as above) represent the hardware required to effectively operate the program. Outline icons indicate hardware that is optional and/or recommended by the reviewer.

PRODUCTIVITY

INTEGRATED

The Swiss Army Knives of Software

"Integration," the current fashion in hot software, seems to be lagging behind in the Apple II world. While *Symphony, Framework,* and *Jazz* slug it out on the IBM PC and Apple Macintosh, the Apple II series has gone virtually neglected. That's good for *Appleworks*, the most famous (and best selling) Apple integrated package—the competition remains weak—but not so good for the II's position at the office. Major business osftware producers have seemingly turned their backs on this business workhorse by not releasing versions of their multi-talented software for it. But perhaps this isn't such a crisis for the Apple II user. Since he's not being plied with slick advertisements, he has time to ask the basic question: what is integrated software, and do I need it?

The first example of what would become known as "integrated software" was *T/Maker*, a spreadsheet with some graphics capabilities, which appeared in 1980. It is only during the last few years, though, that integrated software has achieved its high profile presence in the industry.

But what is integrated software? There are two distinct families of integration, each with a different philosophy of what integration should be. The first type is the more generally known—several different functions operating within a single program. This is the type of integration used by such programs as *Symphony* or *Framework* on the IBM, and *Appleworks* on the Apple II series. The second type is actually a program management system, allowing several separate programs to be used in conjunction, and even at the same time. This second form of integration, which is less known, allows the user to tailor his own integrated system using whatever applications he desires. We haven't found any examples of these integrators for the Apple yet, but we're sure it's only a matter of time.

What should an integrated program do for you? That really depends upon your needs. Most integrated programs consist of a spreadsheet with graphics, and some type of database. Other options can include a word processor, telecommunications, or whatever the programmer deemed appropriate. There is no standard combinations of functions in integrated programs, so you have to comparison shop for what you need the most. Many integrated programs have a lot of bells and whistles, but if you don't need them, you'd be better off shopping for something less flashy, and probably less expensive.

When deciding on which integrated package to purchase, there are several things to watch for: a) does it perform the functions you need? b) are all the functions performed in a similar fashion, or will you have to learn several different sets of command structures? c) do the different functions share information?

You have to ask yourself whether you really want all those functions. A lot of integrated programs are packed with functions, but perform each of them only moderately well. If you need to do a particular task often, like word processing or data management, it may be worth your while to just get a separate program for that task. But if you do several different things, and frequently need to use data from one program in another, you will probably find that an integrated package can be a timesaver, as it eliminates much rebooting and disk swapping.

Complex integration on the Apple is a recent development; *Appleworks* is a groundbreaking integrated package for the II series—and virtually standard equipment for Apples purchased after its release. This section also includes two other integrated packages, one much better received than the other. While these reviews are as up to date as possible, we're sure you'll need to do further research before investing in an integrated package. The picture changes hourly.

—Mark Mansell

Integrated Software

ALADIN

Advanced Data Institute America
$595.00 (II/II+/IIe/IIc), $395.00 (III)
64K (II/II+/IIe/IIc), 256K (III)

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A-	*Value for Money*

With the software market saturated with look-alike spreadsheets and database management systems, it's been several years since I can remember being truly impressed with a new business software package. Upon my initial examination of *Aladin*, I marveled at the extent of its capacity and versatility. I could not help wondering how it could possibly implement such a powerful system within the confines of an Apple computer. I had only seen such features before on mainframes.

Aladin is a synthesis of a relational database, word processor, spreadsheet, statistical package, and a text plotter. According to the manual, it is capable of handling 256 files on-line, 512 fields per file, and 1 million-plus records per file. There is no limit to the number of key fields, and it has extensive sorting abilities as well. Manipulation of the fields, files, and relationships is flexible and easy to do. You can easily impress your clients with the professional quality of the reports and screens. It is possible to make queries in English and Boolean logic of unlimited complexity. Moreover, *VisiCalc*, *SuperCalc*, *WordStar*, *EZ-Writer* and *Apple Writer* files can be integrated with *Aladin*.

Its documentation is a welcome sight indeed. Included within its pages is a good introduction for first-time users of computers and database systems. It is user-oriented, menu-driven, with its manual divided into several tutorials which also includes an informative reference section. I noticed a few minor discrepencies with the manual and the actual operation of the program, but a closer look resolved the problems. When a system is more extensive, it is natural that you will be required to remember more, but since this is an integrated system, it is easier to learn one system than four different ones written by four different companies.

Before opening the manual, I felt the price tag seemed a little high. After studying the program, however, I concluded that with its unprecedented power and flexibility, it would be a shame if consultants, problem-solvers, decision-makers, etc. overlooked this package and purchased separate, more expensive packages which failed to keep up with *Aladin* standards. If you feel it is beyond your budget, I would still encourage you to look at the manual or read a brochure describing the system in detail.

APPLEWORKS

Apple Computer, Inc.
$250.00
64K; Apple IIe/IIc; 80-column card recommended

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A-	A	*Value for Money*

AppleWorks will most likely become the standard software purchase by Apple IIe owners for home and small business use. It combines the three most personal computer applications: word processing, database, and spreadsheet. It's slick, well documented, and easy to use. Very good indeed.

The database program closely resembles *Quick File*, not surprisingly since the same man, Rupert Lissner, wrote both. The spreadsheet bears more than a passing resemblance to *VisiCalc*, although less elaborate and much easier to use. (I used it to do my taxes the first day I had the program.) Furthermore, *AppleWorks* can read *Quick File* and *VisiCalc* files. The word processor, although serviceable, has some significant flaws, but the program offers the added advantage of integration. It won't turn your IIe into a Macintosh, but it does reflect similar thinking. You can put several files (up to twelve) into memory at once ("on the desktop," in the program's parlance), which allows you to switch quickly from one file to another, and the cursor reappears

right where you left it when you return to a file. You can get a directory of desktop files in a window without leaving the file you're in. Very handy.

The data management system lets you store, recall, and report information in several forms. You can zoom in on a particular record and define reports to print your information in label form. You can also insert or delete fields before or after adding information to the file.

The powerful spreadsheet program allows you to store and compute numerical data and carry out "what if?" calculations. You can zoom in on any part of the spreadsheet displayed, but you see the formulas that provide the answers to various problems rather than numerical information. You can fill cells with text, numerical values, or formulas to manipulate information located in other cells. With 64K RAM you get about 1,800 cells; with 128K, about 6,000. You can set your columns to various widths.

You can insert database or spreadsheet reports (but not active files) into a word processing file via a "clipboard." You can also move blocks of text from one word processing file to another, but the spreadsheet and database programs will directly accept only inserts from like files. (Of course, you must adjust database or spreadsheet files with different layouts if you want to merge them.)

You can start a spreadsheet from a database file or vice versa. Although not difficult to do, this is the one place I ran into trouble, because the program runs on ProDOS, Apple's new operating system (supplied on a preboot disk), and neither the manual nor the onscreen prompts take into account the possibility that DOS 3.3 users may not be familiar with ProDOS's file structure. (You also need ProDOS system disks to translate DOS 3.3 files before loading them into *AppleWorks*.) At one point an onscreen prompt asks for the path name, but the uninitiated won't know that this means disk name/file name. Elsewhere, the program automatically supplies the current disk name without telling you. If you simply type the file name, the program balks and doesn't tell you why. I lowered the grades for Documentation and Error Handling because the manual doesn't discuss path names in reference to this procedure and the introduction flatly states that you don't have to use ProDOS prefixes unless using a ProFile hard disk. You can't consult the ProDOS user's manual if you don't have one. However, two disks familiarize you with the program and a tutorial manual comes with a sample files disk and a complete reference manual (with the exceptions just discussed).

You can do a lot of the same things with some plain word processors, but the procedure is far more elaborate, even if you're only moving a block of text from one file to another. Appending a database or spreadsheet report may require considerable disk swapping and rebooting and you might have to translate the file with a utility program as well.

Integration offers another advantage in that the commands in all three programs resemble each other, so that learning to use all three seems more like learning one program rather than three. Moreover, the ProDOS files load and save much faster than DOS 3.3 files. Also, you can use the program with a hard disk drive, which speeds things up even more. In fact, integration goes a long way toward offsetting the compromises made in the component programs. The compromises are minimal in the database and spreadsheet programs, but more significant in the word processing one.

The word processing program is pretty basic; it bears almost no resemblance to *Apple Writer*. The most glaring omission is a provision for deleting a word. The delete block functions works nicely, but proves a bit cumbersome for one or two words. The Delete key is a destructive backspace and the program has no provision for deleting the character under the cursor or for deleting forward. It also lacks a text buffer, so there's no way to restore deleted text, and commands to move the cursor to the beginning or end of a line (although the Tab key substitutes fairly well). Otherwise, the word processor has all the editing functions, which work well. It supports boldface, underlining, superscripts, and subscripts. The latter two, however, are available only from a command menu and require a lot of keystrokes. Carets on-screen indicate the beginning and end of all four modes, but you can't tell what you've got without a printout. Other text formatting commands are also made from the command menu. I found these easy to learn, but somewhat unwieldy.

The word processing program has no mail merge feature for generating form letters, only an ungainly manual method. I find this surprising because mail merge is one of the most common combinations of database and word processing programs. Evidently, a future version will include mail merge.

The word processing program does have several attractive features. It displays text onscreen just as it will print it out and the screen automatically adjusts if you change formatting commands (almost a necessity for inserting tabular material from the database and spreadsheet programs). The program also displays page breaks and allows you to make adjustments immediately—a dramatic improvement over the uneditable print-to-screen displays of a number of other programs. *AppleWorks* saves you most of the trouble. It adjusts windows automatically and won't print a single line of a paragraph at the bottom or top of a page. If you prefer a full screen display, you can set the margins for eighty columns while you write, then

reformat the text when finished. The program supports proportional spacing in an attractive font with serifs (on an Apple Dot Matrix Printer).

As a stand-alone program, I'd give *AppleWorks'* word processor a B overall. It works well and avoids the most common annoyances, such as separate editing and text entry modes, having to turn off wordwrap to type the address at the top of a letter, failure to accommodate text insertion automatically, inability to remember strings of commands, recalcitrant text and printer formatters, and generally weird and unexpected results. With a better selection of delete function, it would probably get an A.

As a whole, *AppleWorks* is a terrific program. It's minor shortcomings are more than offset by the power of integration. It's especially appropriate for home users and small businesses that want all three applications but don't have the time, inclination, or money to get three more expensive and more difficult programs.

MAGIC OFFICE SYSTEM

Artsci
$295.00
64K; IIe/IIc (II/II+ version to be released shortly)

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	D	C-	*Value for Money*

Magic Office System by Artsci claims to combine a word processor that is "a greatly enhanced version of *Magic Window II*," a spelling checker, a spreadsheet "more powerful than *VisiCalc*," and a business graphics feature that will create pie charts and bar graphs.

Give us a break. The word processor is rudimentary and awkward. The spreadsheet is modest but usable. The manual is inadequate. The program will generate graphs, though not directly from the spreadsheet.

The question that springs to mind as you open *Magic Office System* is this: Is this package, which costs $295, worth forty-five dollars more than *AppleWorks* (which sells for $250)? My answer is a definite no. *AppleWorks* lacks a spelling checker and it substitutes a simple database (a slightly revved up version of *QuickFile*), for *Magic Office's* graphics program. The Apple program's word processor and spreadsheet are superior.

Magic Office System takes the desktop/file cabinet metaphor to its logical extreme. When you boot the program, you get a picture of a file drawer (two if you've already created a data disk). You "open" the drawer, and inside are icons—file folders filled with documents and "stationery pads." (Artsci usually spells this word "stationary," both on the packaging and in the manual. You have to wonder about a company that can't spell a major feature of its own program.)

So here you are, using a computer partly to avoid shuffling paper, and you wind up taking information in and out of file folders, sorting "paper," and "tearing sheets" from "stationary pads" to start new files. This would be merely a minor nuisance if the rest of the program worked well. However ...

The word processor is strictly a bare-bones affair. "Greatly enhanced" turns out to mean that the old *Magic Window* has been updated for the IIe and IIc. The arrow keys work and the video display is improved, although text jumps confusingly around the screen when you scroll up and down. That's about it.

It's not that the word processor is unusable—in fact, I've written this review with it—but it is unnecessarily cumbersome. Some serious flaws to *Magic Office System* include:

1) The lack of an insert mode. Unless your correction happens to have the same number of letters as your mistake, you must insert blank spaces to accomodate the change. For longer insertions, you must split the line, then "glue" your paragraph back together. This is far more awkward than most programs.

2) For some unfathomable reason, you cannot back up to the previous line by using the left arrow key; you must move up, then to the right.

3) There is no destructive backspace (you can only erase forward), and no provision for deleting words or blocks of text. You can, however, "lift" text into the buffer a line at a time. (One of *AppleWork*'s flaws is that is lacks a delete word feature, but its editing features are otherwise smooth.)

4) To move a block of text, you have to add it to the memory buffer one line and a time, then reverse the process. You cannot move a sentence that begins in the middle of a line. This is the only program I've seen that will not move blocks of type in units.

5) You can justify text, but only a line or a paragraph at a time.

Needless to say, *Magic Office System* has no outstandingly sophisticated features. The spelling checker, which includes a relatively modest 14,000 words, is serviceable, though you must review every occurrence of each word the program does not recognize—even if it is correct. At least you can correct spellings as you go along, rather than simply flagging them in the text.

The spreadsheet is essentially *Magicalc*, and, in effect, it's a slightly pared down version of *FlashCalc*, which Paladin sells for less than $100. The latter runs on ProDOS and has several financial functions (internal rate of return, future value, interest rate) that are absent from *Magic Office*. Otherwise, the *FlashCalc* and

Magic Office's respective spreadsheets are virtually identical.

VisiCalc users will recognize *Magic Office*'s function commands (@SUM to add a range of cells, for instance), clash commands (e.g., /B to "blank" a shell), and alphabet soup menus (e.g., DGILR$ for default, general, integer, left justify, right justify, dollars, or a rudimentary graph made of asterisks).

The maximum spreadsheet size is the basic 254 rows by 63 columns. "More powerful than *VisiCalc*" means the program can use up to 512K of RAM and it permits variable column widths. The copying command is somewhat more powerful than *AppleWorks*, but the *AppleWorks* spreadsheet is larger and has more powerful formatting commands (including any number of decimal places and percents).

The graphics program generates pie and bar graphs from a spreadsheet-like matrix. You cannot make graphs directly from a spreadsheet, but you can copy spreadsheets into the graph matrix via a "clipboard."

The program's integration is reasonably smooth and flexible. The clipboard also allows you to insert graphs or spreadsheets into a word processing document.

One advantage of *Magic Office* is that it is very easy to learn to use. However, this is partly counterbalanced by poor documentation. The tutorials go on forever. Once you've got the gist of the file drawer and folder system, you could quickly master the program from reference cards. The manual also lacks an index and a trouble-shooting section.

The program comes with two system disks (one of which would not boot in the copy I received) and data disk, which includes some essential parts of the program. Backup or replacement copies of the system disk are available for twenty dollars.

The graphics program would not print properly with the Grapple and printer card—probably the most common graphics card around for the Apple—but Artsci promised a replacement disk to correct this problem. In fact, I expect this little difficulty to be corrected by the time you read this.

As IBM still remains the giant on the business software horizon, we loyal Apple people keep hoping for a sound, integrated program that minimizes the hardware limitations of the Apple. *Magic Office*, alas, is not the answer to our prayers. It may be adequate for home use, but not for serious business applications—certainly not for secretarial tasks and word processing. All in all, I feel you'd be better off with *AppleWorks*.

III E-Z PIECES

Haba Systems
$149.95
128K; Apple III

Overall Rating	A	A	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

As you can see from the grades, I like this program. The same man who wrote *QuickFile*, Rupert Lissner, wrote this package. The user interface simply improves upon the already good *QuickFile* interface. *III E-Z Pieces* gives you a spreadsheet, a database (an expanded version of *QuickFile*), and a word processing program. These three tools interact via the "clipboard" (similar to the concept used with the Macintosh and Lisa). The whole thing works very quickly, even the movement of data back and forth between documents.

The database offers a more powerful version of *QuickFile*, with greater capacities for the various data files and faster sorts.

The spreadsheet resembles *VisiCalc* in capability, but has basically the same user interface as *QuickFile*. You may miss that long coffee break while loading a large model, because *III E-Z Pieces* loads models about ten to twenty times faster than *VisiCalc*.

The word processing program provides a fine utility, much better than *Applewriter* and nearly as good as *Word Juggler*. It has the added benefit of coming in an integrated package. Most of the additional capabilities involve printing, among them: selection from multiple (three) printers; more than three type sizes; the ability to store (formatted) output on disk; the ability to dump the current screen to the printer; no copy protection; and more extensive Help screens.

The cut and paste feature allows you to move data from any document in a word processing file, or between database and spreadsheet files. Have no fear, *III E-Z Pieces* reads *QuickFile, VisiCalc*, DIF, and ASCII files. I wish the word processing program could read Pascal text files; currently, it reads them in and translates all blank compression codes into two-character sequences with a carriage return at the end of each line instead of just at the end of a paragraph.

One of the product's greatest strengths is its ability to keep multiple documents open simultaneously on the "desktop" and switch between them on command. In fact, if the program has a weak point, it's the documentation. Don't get me wrong—it's good, just not as good as the software. You need more technical information if you want to use files outside of the program, or if you get error messages while interfacing a new printer. I got bitten by a printer interface problem when I tried to set up the custom printer as my IDS with a PKASO

interface. The program couldn't find my printer driver. I called Haba and they came up with the solution quickly. Make sure that the hex code for the device type on your PRINTER driver is a legal code for a printer and you'll be fine. The PKASO wasn't, so I changed it and everything worked. The technical support people are most helpful and polite.

All things considered, *III E-Z Pieces* is an excellent product with good documentation and the support of a fine company.

TEXT MANIPULATION

Word Processing

Word processing is the fast becoming the standard mode of operation for thousands of writers. The speed, flexibility, and logical organization of word processing programs eliminate retyping, leaving more time and energy for composition. A word processor allows you to write at the keyboard, making changes to your work that couldn't be done on a typed manuscript without reams of erasable paper, scissors, and paste. When you are through, you store your work on a floppy disk—it only takes one to hold a medium sized book—to be recalled later for editing and proofreading. You can make as many revisions as you like, keeping previous versions or erasing them. Finally, you can make a clean, corrected printout of your text without retyping it.

No single word processing program is the best. As with almost everything from shoes to chewing gum, the best word processing program is the one that works for you. Analyze your needs, study the programs, then make a selection based on both. Just as you wouldn't buy black patent leather shoes for jogging, don't let a salesman stick you with a complicated, expensive word processor like *WordStar* just to write memos to your partner.

The reviews in this section will give you a good idea about hte Apple word processing marketplace. Read them. Then go to your local computer store and ask for demonstrations of some of the programs. Talk to the members of Apple users groups in your area—among them is undoubtedly a wealth of word processing information, and probably someone whose word processing needs are similar to yours. If no demos or users groups are available, study your choices very closely. Be absolutely sure the program you buy will run on your computer.

The key to choosing a word processing program is determining what you want from it first. A designer who wants stylized printouts, but expects to do little text entry or editing, may not need a word processor in the strictest sense of the word. A newspaper columnist or bestselling novelist needs a very advanced editor, but can do without fancy formatting. Will your files be long or short? Will you be combining form letters with a mailing list? Do you want a program your kids can use? Do you have other software you want it to integrate with? When you go to the computer store, have a very clear idea of your needs, whether they be simply writing magazine articles, designing a newsletter, or compiling financial reports with graphs and tables. With your needs in mind and this book in hand, you'll be well armed for an assault on the software salesmen.

Word processing programs have three components: the editor, the file manager, and the print formatter. The editor is the part of the program that accepts what you type and helps you insert, delete, move, and otherwise manipulate text. The file manager performs some similar functions, but on a larger scale; with it you create, erase, copy, and otherwise manipulate files. The print formatter organizes your work into an attractive whole and sends it to your printer.

Editing

Editors tend to fall into two categories: mode oriented and non-mode oriented. Mode oriented editors allow you to enter text in one mode, delete it in another, search, replace, reformat, and move the cursor in one or more others. Usually, when you open a file you are in either insert or cursor movement mode. You enter all your text, then switch modes from delete to search and replace or insert as you go back over it making changes. If you tend to write in big blocks and edit all at once, this sort of editor will probably do for you.

Non-mode oriented editors function much more like dedicated word processors. When you open a file you can insert, delete, search, reformat, and move the cursor all over the screen. All functions are available to you all the time. You can type a few sentences, hop back and change a word, and return to where you left off, all in the blink of a cursor. If you tend to rethink your work every few words, this kind of editor is a must.

No two word processing programs are exactly alike, but most of them share many virtually standardized functions. The most important of these appear on the chart in this section. They are the ones you shouldn't have to live without.

Cursor control: the more the better. You should be able to move the cursor backward and forward by character, word, line, page, and to the end or beginning of the file. If you can't, the program had better have some other real whiz bang features. The last thing you want is an editor that forces you to move the cursor character by character, or even line by line, through a file.

Search and Replace: one of the most useful things your word processor can do. If you discover you've misspelled your great aunt Sybil's name throughout your letter to grandmother, you can tell the computer to find the word as misspelled and replace it with the correct spelling. In the process you should have the options of: searching backward from the end of the file; having the program ask you whether to change each occurrence as it finds it; changing all occurrences without even showing them to you; and ignoring or paying attention to case and punctuation.

Move Copy Blocks: the computer's answer to scissors and paste. Every word processor worth its bytes can move or delete user-defined chunks of text. You tell it where the beginning and end of the "block" is, put the cursor where you want it to go, and tell the computer to move it. Or you can delete it, or copy it into another file on the disk.

Wordwrap and Hyphenation: automatically returning, and splitting words at the ends of lines. Virtually all word processing programs have a wordwrap mode. The only time you hit the return key is at the end of paragraphs. With automatic hyphenation you can forget about breaking long words. The program applies basic rules of syllabification to long words that fall at the end of lines. It automatically breaks them with "soft" hyphens. When you change margins and reformat, putting the long words in the middle of lines, these hyphens are automatically removed. Some programs let you insert your own soft hyphens, which is useful when the computer can't figure out where the word breaks. Many allow you to turn off the hyphenation feature. If you plan to transfer your text to some other program, such as a spreadsheet or database, soft hyphens could gum-up the works.

Undo and Windowing: These two recent developments are destined to become standard features. Undoing is recalling the last text that you deleted. Because of its newness there is little standardization: some programs undo character by character, others can recover huge blocks of copy. A few allow you to set the amount of text that can be recovered. If you've ever deleted a beautifully crafted sentence by accident, you understand the value of Undo.

Think of your monitor as a window on your word processing file—you see part of the text, and scrolling moves it so your view changes. Now imagine that your screen is two or more smaller windows. Through each one you see part of a different file. You can cut pieces from one and paste them in another. Some programs allow you to adjust the windows' sizes. Some can have an infinite number on screen at once, others only a couple. Don't be fooled, however, a few programs that say they have windows actually can only present two sections of the same file on screen at once.

Screen Format: how the program looks and what it tells you. Minimally, your word processor should tell you the name of the file you're editing, what mode you're in (if it has them), and where the cursor is (by row and column). Hopefully, the screen display includes margin and tab settings, amount of free disk space, and some command reminders or help functions. When you see a program demonstrated, see if you can work with the display. If it is too cluttered, or doesn't offer enough information, you won't be comfortable with it.

Other Considerations: Look closely at how command sequences are arranged on the keyboard. They usually correspond to either logical mnemonics (Control-W to move forward one word, for example) or convenient locations (such as all cursor movements within reach of your left index finger). Can you easily and repeatedly hit whatever combination of keys moves the cursor back and forth? Can you easily delete, insert, and scroll the text? Having to reach across the keyboard or to use both hands for one command is generally not acceptable.

File Management

File managers duplicate some operating system functions and introduce a few more. With them you can create, delete, copy, rename, and transfer files. If they're really good you can combine and keep backups of your files, and find out how much space you have left on disk. A few word

processing programs actually lack file managers—when you boot them up you're in the editor. When you save your file you're returned to the operating system.

Backups: some programs keep the previous version of your file as a backup. When you make revisions, the backup is updated to reflect the most recently unrevised version. You should be able to delete backups, and even turn off the automatic backup function. While it is reassuring to know that you have an extra copy, it takes up a lot of space on your disk, and sometimes is just not that important.

Using Operating System Commands: from the editor or the file manager. If your file manager can't erase files, can you access the operating system command to do so without actually exiting the program. If it doesn't offer you a list of the files on disk, can you call up a directory? Ideally, your word processing program should be so transparent you can execute any DOS or CP/M command from anywhere in the program. That isn't usually the case. However, if you're composing your versions of the Great American Novel and you get a disk full error, it's nice to be able to remove the full disk, insert a new one, format it, and save your file to it, all without leaving the editor. Short of that, you should be able to delete some unimportant files from the full disk while still in the editor (making room for your new prose).

Save and Return: to put your most recent work safely on disk without actually closing the file. Remember that if the lights go out, or there's a power surge, you will lose everything stored in RAM. Saving and reopening your file every few minutes is time consuming, but preferable to losing several hours of work. Even better, however, is saving the file you're editing and automatically reopening it, preferably putting the cursor right back where you left off. Some programs do this automatically at timed intervals. This is just fine until you realize that you've been editing the wrong file. If your program makes automatic backups, you're OK—just scrap the edited version and rename the backup as the real thing. Otherwise, it's wise to make backup files, or keep backup disks.

Print Formatters

First off, you have to have a printer. Word processing programs exist to make printouts of your text. Consequently, their print formatting functions are quite complex.

Screen Oriented: what you see is what you get. In the best screen-oriented programs, type that you want bold appears bold onscreen, words to be underlined are. Margins, tabs, and paragraph indentations all look on the monitor much like they will on paper. If you're a visually oriented person, you'll like screen-oriented word processors.

Character Oriented: what you get has little to do with what you see. As you type, you enter print formatting commands like "\P" to start paragraphs or #I for italics. When you print out the file, the computer translates these symbols into formatting commands and you see how it looks. Some character-oriented programs can display the page as it will appear just prior to printing, but you can't edit it.

Pages: breaks should be indicated onscreen. You should be able to force them with a command in the text. Really smart print formatters will avoid widows—a single line of a paragraph alone at the bottom or top of a page. You should have the option of starting and stopping printing at any page in the document. If you only need a printout of pages 12 and 13, you should be able to get it.

Headers and Footers: like the running heads in a book, lines of text at the top or bottom of each page. Some programs will alternate two different header or footer lines on odd and even numbered pages. Ususally, if a program can handle headers and footers it can also number your pages. You may even have the option of starting the numbers with something other than 1. Footnotes are a special case; a few programs can actually place them on the bottom of the appropriate page—a real advantage to academic writers.

Spooling and Chaining: editing while you're printing, and printing several files one after another. Obviously, waiting for a long document to print out wastes your writing time. A few programs let you reenter the editor while a file is printing out, so you don't have to stop working. If you have several files that follow one another, you can chain them together and only execute the print routine once. Their page numbers can be continuous, rather then starting over at 1 with each one.

Justification and Proportional Spacing: text with even margins on both sides is justified. To justify your type, the print formatter puts extra space between words to space out each line. If your printer supports it, many word processor suse proportional spacing—varied space between letters—to

make the gaps between words smaller and the text more attractive. Text can also be flush left (or left justified), flush right (or right justified), or centered.

Special Effects: the more you have, the closer to typeset your printout looks. Unless your needs are few and you're very tolerant, you shouldn't settle for a word processing program that doesn't print boldface and underlined type. Beyond that you might want subscript and superscript.

If you expect to use accents a lot, an overstrike function prints a letter, backs the printer up a space, prints the accent, then goes on. It can also be used for emphasis if you overstrike with the same letter (but that's virtually the same as boldface).

Don't expect you Apple and word processing program to perform like a $15,000 dedicated word processors. The best of the program reviewed in this book may come close, and so do their price tags. Most are considerably less flamboyant, cost less, and can handle relatively straightforward word processing. All but the worst dogs are faster, quieter, and more efficient than a typewriter.

Mailing List Management

Mailing list managers are one of the best reasons to own a computer. If you've ever had to address a hundred Christmas cards or a thousand newsletters you'll really appreciate what this type of program does. You enter in names and addresses. The program lets you manipulate them all sorts of ways. You print out each address on a label or envelope. Here are the things, more specifically, that a mailing list manager should do.

Custom Labels: you should be able to arrange the elements of your label any way you want, with extra spaces and lines, some lines centered, and so forth.

User-definable Field Length: if you're stuck with fifteen characters for the last name and all your customers have long names you're in trouble. You should be able to make some fields longer, even if it means taking characters away from other fields.

User-definable Field Names: you don't have to store names and addresses in your mailing list manager. If you can change the field names (from "name," "street," and so forth) to fit some other application (like "song," "album," and "artist,") you can use the program as a simple file manager.

Form Letter Merge: you should be able to design a special form letter with your word processor, then have the mailing list manager insert the names and addresses in the appropriate places as it prints one copy of the letter for each person on the list. You should be able to insert the individual or company's name into the middle of the text, with the spacing on the printed letter adjusted for the name's length.

Sorting: if you do mass mailings, you'd probably like to be able to sort your mailing list by zip code. Your mailing list manager should be able to sort on any field (last name, first name, state, etc.), print out selected portions of the list, and print it out in the sorted order.

Compatibility: if you already have your mailing list stored in a file manager, you'll want to transfer it to your mailing list manager without retyping it. Make sure the two programs are compatible before you buy.

Layout

Laying out advertisements and newsletters has long been the private domain of graphic artists, but the recent trend toward greater graphics capabilities has pushed layout into the domain of microcomputers. Virtually any computer user can create attractive designs without touching a t-square. Layout programs let you creatively combine text and graphics while forcing you to follow guide lines and stay within the margins. Even in the world of magazine and newspaper publishing, computerized layout is a very new innovation. Consequently, there are few benchmarks against which to test layout programs. Even the simplest can seem like a miracle to the bleary eyed paste-up artist. The Apple II has taken a backseat to its little brother Macintosh in the layout department, so we haven't found too many professionally-oriented programs for this section. What we have is two programs that help you place text and graphics on the screen, then print them on a dot matrix printer. We're sure the popularity of computer publication will spur vendors to release more such programs for the Apple.

—Mia McCroskey

Definitions for Word Processing Chart

● = performs this function or has this feature
◖ = partially performs this function or has similar feature
* = sold separately

Minimum Memory—The minimum amount of memory required by the program (in kilobytes). Two numbers indicates alternate versions of the same program (see the review for explanation).

Copy Protected—The user cannot copy the disk. Backups may be supplied by the vendor for a fee.

Tutorial—Step-by-step instructions on a disk or in the documentation which help you get started and teach you to make full use of the program's features. Tutorials often use sample text provided on disk.

On-line Help—As you work with the program you can have helpful information displayed on the screen. When you ask for help it may appear on a portion of the screen, leaving your work visible, or it may replace your work until you are through with it.

Operating System—DOS 3.3, ProDOS, CP/M, or Pascal.

Mode Oriented—The program has special modes for inserting, deleting, and even moving the cursor.

Cursor Control—Moving the cursor by various jumps should be possible:*Character = Ch; Word = W; Line = L; Page = P; File = F;* ● = All (and may include others).

Deletion—Text may be deleted by: *Character = Ch; Word = W; Line = L; Page = P; File = F;* ● = All (and may include others).

Block Manipulation—Sections of text can be specified and moved, copied, or deleted within a file.

Boilerplates/Macros—Regularly used blocks of text or command sequences can be stored on disk and called up into any file using two or three keystrokes.

Windows or Split Screen—The screen can be divided into two or more windows, each containing different parts of the same file (split screen) or parts of different files (windowing). Windows may also contain information such as help or a file directory. You should be able to work in any window currently displayed by switching with a few keystrokes.

Automatic Hyphenation—While in a wordwrap mode, the program automatically hyphenates words. These hyphens are automatically dropped when text is reformatted and they no longer fall at the end of the line. You should be able to turn off this option.

Search/Replace—The program can search a file for a given string, and, if desired, replace it with some other string.

Page Indicator—The number of the page you are on is displayed on the screen while you are in the editor.

Screen Width—Some programs support 40-column screens, others require or can be used with an 80-column card. A few allow much wider margins and have horizontal scrolling.

Undo—A "change-your-mind" function that restores the text you most recently deleted. Some programs can undo only a few characters, others can bring back large passages. A few allow you to set the size of the undo buffer.

Boldface/Underline On Screen—Variations of type are displayed as such on screen. They may actually appear bold or underlined, or the display may employ some form of highlighting such as inverse video. Displaying commands or special characters before and after bold or underlined words is not adequate.

Justification—Full Justification = *FJ; A flush left margin = LJ; A flush right margin = RJ; Centered text = CJ.*

Variable Line Spacing—As on a typewriter, setting the text at single, double, triple, or some other spacing.

Variable Page Length—Adjusting the number of lines or inches per page so you can use shorter or longer forms.

Page Numbering/Headers/Footers—Automatically numbering and placing user-specified headers and/or footers on the pages of a document as it is printed. Some programs do only one or the other, or some limited combination.

Superscript/Subscript—Placing alphanumeric characters just above or below the line of type. Used for scientific notation and footnote references, among others.

Automatic Backup—When you save a file, some programs automatically store a copy of its previous version on disk as well.

Save/Restore to Editor—Storing the current revision of a file and later returning to the editor, preferably to exactly where editing left off, all with one command.

Merging—The ability to combine two files, or, while editing one document, to insert part of another that is stored on disk.

Telecommunications Format—Many word processing programs use proprietary formats for storing files, making it next to impossible to transfer them via modem to any other programs. A few communications-oriented programs store files in a more universally acceptable format, or offer a special format for telecommunications.

Embedded Print Commands—Including commands for format changes such as bold, italic, tabs, margins, page breakes, and footnotes in the text without having to use any special format, such as isolating the item to be underlined on its own line.

File Chaining—Several files can be linked to print out one after another, usually with continuous page numbering and/or headers or footers.

File Spooling—Several files can be "queued-up" and printed while you return to the editor or some other utility.

Proportional Spacing—If the printer supports it, the space between letters in fully justified text can be adjusted to avoid ugly gaps between words.

Printing Partial Document—You can specify which pages of a file you want printed, beginning and ending anywhere within the file.

Form Letter Merge—A mail merge function that combines the elements in a list with a single text. This is most often used to print out a form letter to all the people on a mailing list. This function is included with some programs and separately available with others. An asterisk indicates that the mail merge program costs extra.

Index—An alphabetical list with page references to help you find information in the manual quickly.

Glossary—Definitions of terms found in the manual and specialized microcomputer terms.

Reference Cards/Keyboard Template—Some form of card, folder, or poster with brief explanations of the program's commands that you can keep by your computer.

Word Processing

		General					Grades								
		Minimum Memory	Copy-Protected	Tutorial	On-Line Help	Operating System	Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Mode Oriented	Cursor Control	Deletion
Apple Writer IIe IIe/IIc	**$149.00**	64	●	●	●	3	B+	B	B	B+	A	B+	●	●	L, W
Bank Street Writer II+/IIe/IIc	**$69.95**	64/ 128				3	A	A-	A	A	A	A	●	L,C F,P	●
Cut & Paste IIe/IIc	**$34.95**	64			●	3	A-	A	B	B+	A	A	●	●	●
Format II II+/IIe/IIc	**$150.00**	64/ 128				3 PD	C	D	D	B	B	D	●	C,L P,F	C,L P,F
Homeword II/II+/IIe/IIc	**$69.95**	64	●	●	●	3	A-	B	B-	A	B	A	●	●	●
Letter Perfect II/II+/IIe/IIc	**$104.95**	48	●	●		3	B	B	C	A	B	B	●	●	●
Magic Window II II/II+/IIe/IIc	**$149.95**	48	●	●		3	B	A-	B-	A	B	B	●	L,P	L,S
MegaWriter II+/IIe/IIc	**$99.95**	64	●			PS	F	F	B	B	B	F	●	●	●
Peachtext II/II+/IIe	**$250.00**	48		●	●	C	B	B+	A	B+	B+	B	●	●	●
Pen Pal II/II+/IIe/IIc	**$29.95**	48		●	●	3	C	C	B	B	A	C	●	C,F	C, L,F
pfs:Write IIe/IIc	**$125.00**	64	●	●	●	3	B	A-	B	B-	B	A-		●	●
Screenwriter II II/II+/IIe/IIc	**$129.95**	48	●	●	●	3	B	C+	C+	B	B	B	●	●	●
State of the Art Word Processing II/II+/IIe/IIc	**$395.00**	64	●	●	●	PS	D	B	F	B	B	F		●	●
Supertext / Home-Office II+/IIe/IIc	**$125.00**	48	●	●		P	B	C	D+	B	B	B	●	L,P F	●

Operating System
P = Proprietary
3.3 = DOS 3.3
PD = ProDOS
CP/M = CP/M
PS = Pascal
AP = Applesoft
SOS = SOS

Cursor Control and Deletion
● = All
C = Character
L = Line
W = Word
P = Page
F = File
S = Sentence

Editor								Formatter						File Manager				Printer						Document		
Block Manipulation	Boilerplates/Macros	Windows or Split Screen	Automatic Hyphenation	Search/Replace	Page Indicator	Screen Width	Undo	Boldface/Underline Onscreen	Justification	Variable Line Spacing	Variable Page Length	Page Numbers/Headers/Footers	Superscript/Subscript	Automatic File Backup	Save/Restore to Edit	Merging	Telecommunications Format	Embedded Print Commands	File Chaining	File Spooling	Proportional Spacing	Printing Partial Document	Form Letter Merge	Index	Glossary	Ref. Card/Keyboard Temp.
●	●			●	●	40/80	●	●	●	●	●	●	●			●	●	●			●	●	●	●		●
●	◖			●		38	●		↑I	●	●	●				●			●			●		●		●
●	●				●	80	●		↑	●	●	◖		●	●	●						●			●	●
●				●	●	80	●	●	↑I	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●
●		●		●	●	40/80	●		↑↓	●	●	●		●					●					●	●	●
●				●	●	40/80			●	●	●	◖	●		●	●	●	●	●	●	●	●	●	●	●	●
●	●			●	●	40/80	●		●	●	●	●	●			●	●	●	●			●	●			●
●	●			●		40/80		◖	●	●	●	●	●			●		●	●		●	●		●		●
●	●		●	●		80	●	●	●		●	◖	●		●	●	◖	●		●	●	●	●	●		●
●						80			I	◖	●	◖	◖		●	●	●	●			◖	●		●	●	●
●	●			●	●	40/80	●	●	↑I↑		●	●	●			●	●	●	●	●		●	●	●	●	●
●			●	●		40/70	●		●	●	●	●	●		●	●	●	●	●	●	●	●	●	●		●
●	◖			●	●	80	◖		↑I↑	●	●	●	●		●		●	●				●	●			●
●	●	◖		●		40/56/70			↑I↑	●	●	●	●		●	●	◖	●	●			●	●	●		●

Justification
- ← Left Justified
- → Right Justified
- I Center Justified
- ↔ = Fully Justified
- ● = All

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Word Processing

		General					Grades								
		Minimum Memory	Copy-Protected	Tutorial	On-Line Help	Operating System	Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Mode Oriented	Cursor Control	Deletion
Word Handler II II+/IIe/IIc/III in emulation mode	**$79.95**	48	●	●		3	C	B	C	C	C	C	●	●	●
Word Juggler III	**$229.00**	128	●	●	●	PD S	B+	A	A-	A-	A	B	●	●	●
Word Juggler IIe IIe/IIc/	**$189.00**	64	●	●	●	PD	A	A	B	A	A	A	●	●	●
WordStar, V.3.3 II/II+/IIe/III	**$350.00**	64	●	●	●	C	A-	C+	B+	A-	B+	B+	●	●	●
Write Away II/II+/IIe/IIc	**$119.00**	64		●		P	C	D	C	C	B	C	●	●	●
Write Choice II/II+/IIe/IIc	**$44.95**	48		●	●	3	B-	B-	B	B	B	B	●	●	●
Zardax II+/IIe/IIc	**$210.00**	48	●	●		3	B+	B+	B-	A	B	C-		C,L	C,F
Zardax III III	**$210.00**	128	●	●		S	B	C+	A	A	B	B-		C,L	C,F

Operating System
P = Proprietary
3.3 = DOS 3.3
PD = ProDOS
CP/M = CP/M
PS = Pascal
AP = Applesoft
SOS = SOS

Cursor Control and Deletion
● = All
C = Character
L = Line
W = Word
P = Page
F = File
S = Sentence

Editor								Formatter						File Manager				Printer						Document		
Block Manipulation	Boilerplates/Macros	Windows or Split Screen	Automatic Hyphenation	Search/Replace	Page Indicator	Screen Width	Undo	Boldface/Underline Onscreen	Justification	Variable Line Spacing	Variable Page Length	Page Numbers/Headers/Footers	Superscript/Subscript	Automatic File Backup	Save/Restore to Edit	Merging	Telecommunications Format	Embedded Print Commands	File Chaining	File Spooling	Proportional Spacing	Printing Partial Document	Form Letter Merge	Index	Glossary	Ref. Card/Keyboard Temp.
●				●	●	66	◖	●	↔			◖	●	●		●	●					●		●		●
●	●			●	●	80+		●	●	●	●	●	●	●		●	●		●	●		●	●	●	●	●
●	●			●	●	80+		●	●	●	●	●	●	●		●	●		●			●	●	●	●	●
●	●		●	●	●	40/80		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	◖		●	●		40/80	●	●	●	●		●	●		●	●	●	●			●	●		●	●	●
●			●	●	●	40/80		●	●	●	●		●		●	●	●	●	●			●		●	●	●
●	●			●		40/80		●	●	●	●	●	●			●	●	●	●	●		●	●	●		●
●	●			●		40/80		●	●	●	●	●	●			●	●	●	●	●		●	●	●		●

Justification
← = Left Justified
→ = Right Justified
I = Center Justified
↔ = Fully Justified
● = All

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Text Manipulation
Word Processing

APPLE WRITER IIe

Apple Computer
$149.00
64K; IIe/IIc

Overall Rating	B+	B+	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B+	*Value for Money*

Apple Writer IIe is a word processing program written specifically for the Apple IIe and ProDOS. Although similar to *Apple Writer II*, this version makes excellent use of the new IIe keyboard. It is an adequate word processing program for most home and undemanding business users. However, sophisticated users may find some of the text editing and formatting procedures somewhat restrictive.

Apple Writer IIe consists of two copy-protected program disks (Master and Backup), a manual, and a WPL manual. "WPL" is the abbreviation for Word Processing Language. This programming language is not difficult to learn, and it is used to perform some advanced word processing tasks with *Apple Writer IIe*.

Apple Writer IIe requires only one disk drive and a 40-column screen; but a second drive eliminates a considerable amount of disk swapping, and an 80-column card allows you to view the document you are creating as it will be printed. An extended 80-column card allows you to store much more text in RAM, but doesn't represent a major word processing enhancement unless you work with very large documents.

The manual is a good reference guide to operating the program, and includes a tutorial in Appendix A that will have you writing, editing, formatting and printing standard documents in just a few hours. The CTRL-commands required to operate the program are logical and easy to remember. If you happen to forget some of the commands, a Help menu is available on-screen.

By using the Closed-Apple key and the Arrow keys you can move up or down the screen twelve lines at a time, or back and forth one word (or twelve characters) at a time. The Open-Apple and Arrow keys are used to perform such tasks as block moves, deleting text, and so on. Moving blocks is accomplished by temporarily storing the data in RAM before inserting it elsewhere, and one problem you may encounter is that the temporary RAM location can hold only about 1K of text at a time. So moving large blocks of text may require several steps. This can be an irritating limitation.

Apple Writer IIe displays a Data Line at the top of the screen. This Data Line informs you of how much memory is left, the current cursor position, the length of the document, the document's file name, and several other functions. By pressing the Escape key, the Data Line changes to show you the current tab settings. Press the Escape key again and all you see is text. Once more brings up the Data Line again.

In addition to the standard CTRL-commands, *Apple Writer IIe* makes use of embedded print formatting commands. These are also logical and so easily remembered. For example, .LJ means Left Justify, .CJ is Center Justify, and .LM10 sets the left margin at 10 spaces in from the edge of the paper. *Apple Writer IIe* also lets you embed Control or Escape characters in your text, to allow your particular printer to perform such special functions as underlining, boldface and shadowstrike, or sub- and supercript characters.

You may also create a customized Glossary which lets you enter a frequently used phrase simply by pressing two keys. For example, in writing this review, I created "Apple Writer IIe" as a glossary word. Whenever I wanted to type "Apple Writer IIe" I only had to press the Open-Apple and A keys, and "Apple Writer IIe" was entered into the text. You may have up to ninety-nine such definitions in one Glossary.

You may save your current active file in part or entirely, or load a complete or partial file that is already stored on disk. You may also save Tab settings, Printer files, or Glossary files to disk for later use.

The Word Processing Language part of the program includes its own manual, used both as a reference and as a tutorial. I cringe at the thought of having to learn a new programming language; but I discovered that, once I'd mastered the *Apple Writer IIe* commands, it was easy to learn the WPL. Using them together, it was a pleasure to accomplish some very attractive word processing tasks with little effort.

Among the tasks that *Apple Writer IIe* and WPL can jointly perform are the creation of custom reports, individualized form letters, arithmetic calculations within texts (useful in creating reports), repetitive program functions, and your own menu programs. WPL programs are written using *Apple Writer IIe*, and executed from within the program by entering the Load module and typing "DO PROGRAM NAME." WPL performs many sophisticated tasks; but one that is required perhaps more than any other is the ability to repeat tasks, such as the printing of personalized form letters. Using WPL, you merely type the form letter once; the WPL program will fetch new names and addresses from a mail list file and continue to print letters to all the individuals you want to contact. It is a powerful portion of the package.

Apple Writer IIe and the WPL represent a reasonably complete word processing system. It is also, for the most part, enjoyable to use. I did find that I missed the commands to clear text from the cursor to the end of the line, paragraph, or page, as well as some other snazzy commands. I also found that a very fast typist can sometimes be confused by the Type Ahead buffer. But *Apple Writer IIe* is a good package, able to meet most of your Apple IIe word processing requirements.

THE BANK STREET WRITER

Broderbund
$69.95
64K (II+); 128K (IIe/IIc)

The Bank Street Writer is a rudimentary word processor designed to acquaint students with the capabilities of word processors. It also encourages writing by both students and adults because of its simplicity of use. This version differs from the Scholastic version (which belongs in the classroom) in providing you with extra documentation and a third copy of the program. Please see the Education section for a review of this program. A review of *The Bank Street Speller*, a spelling checker for this program, also appears in the Education section.

CUT & PASTE

Electronic Arts
$34.95
64K; Apple IIe/IIc

Overall Rating	A-	B+	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

This remarkably refreshing word processor for the Apple IIe is designed for home use by people who do not use a word processor daily and do not want to put time into learning many exotic commands. The interesting liner notes on how it came into being and the small number of commands needed to use it demonstrate its simplicity of use. The documentation consists of a twelve page booklet of instructions, which in no way should be considered a tutorial on the program. Rather, the manual merely describes the features available and suggests that you experiment. Because the program proves so easy to use, you really need very little formal instruction.

In addition to the manual, the package includes two copy-protected disks, the program disk and the document disk. The copy protection may cause problems if you need to recover any lost files. Also, if the program disk becomes unusable for any reason, you have to wait to obtain a replacement from the manufacturer. I saw no provisions for obtaining a backup copy of the program disk.

Cut & Paste offers an easily used, functional menu plus an informational display at the top and bottom of the screen. If you do something wrong, you can use the "escape hatch" built into the menu system. Like most word processors, the program lets you type over text, cut and paste text, and move text around in the document. It also has automatic wordwrap and various housekeeping disk commands. You can set margins and page size, indent, store text in a buffer for later retrieval, tab, number pages, and set page breaks. Because the program is intended for light home use, it lacks many features common in advanced word processors, such as embedded commands for special printing features.

For an easily learned and functional word processor, you need look no further than *Cut & Paste*. Just don't forget that this user-friendly program is intended for home use. It does not possess all the capabilities of a business-oriented word processor, such as search and replace, embedded print commands, glossaries, and setting tabs. If you want a word processor containing many sophisticated and complex word processing applications, look elsewhere. For a remarkably simple word processor for home management, this program proves its excellence.

FORMAT II (Enhanced Version)

Kensington Microware
$150.00
64K (DOS 3.3); 128K (ProDOS); II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	D	B	*Error Handling*
Documentation	D	D	*Value for Money*

Format II will do—in some fashion—almost everything you could ask of a word processing program, and it is not difficult to learn. However, editing and writing, which are done in separate modes, are awkward.

When entering text, you must use the Escape key to switch back and forth between entry and editing modes to perform routine editing functions. This is an unnecessary nuisance shared by few newer programs. The Delete key erases the letter *under* the cursor rather than backspacing over the unwanted letter, making it cumbersome to correct typos even if you catch them immediately. Some print formatting, such as setting margins, is done in the editing mode, but you have to enter yet another section of the program through a print menu to switch between double- and single-spacing. Even then, it's a technical and needlessly unclear procedure.

After you have entered sixty lines, the computer beeps at you. This is its way of telling you to go to the Main Menu and store or print the file. This is inconvenient if the break falls in midsentence, and it usually does. After you've stored the file, you're supposed to type the rest of the file even though there is no prompt on the screen to tell you where you left off. The program does "remember" the name of your document and stores the sixty-line files as numbered pages, but this is a small compensation.

Format II is acceptable for some secretarial uses. It resembles some dedicated word processors, and the sixty-line save is not really a drawback if you're only doing short business letters or final drafts of material that doesn't need major revision. It is also one of the few word processors for Apples that prints copy as it's displayed on the screen and it has a spooler, which allows you to continue to use your computer while the printer is running.

The manual is abysmal. Rather than producing a new manual for the enhanced version, Kensington added a new section to the front of its old manual. Although stylistically this section is a dramatic improvement over the older portions of the book—it's typeset rather than printed out on a letter-quality printer—you still have to refer to the back sections to look up *Format II*'s more sophisticated functions, and the deeper you get into the reference section, the more technical and unintelligible it becomes. The index is inadequate, making it difficult to find instructions for even some basic functions.

Format II does have a few redeeming qualities. It's one of the few programs for the Apple that displays text as it prints. However, it won't reformat the screen properly if you change the margins after entering text. It performs almost all functions available on more expensive word processors. Error handling is well done; it is unlikely that you will lose text if you make a mistake. And, for once, a software publisher has provided a copyable program disk.

For II+ owners, Kensington supplies a keyboard enhancer and other minor hardware by mail for $5. (It used to be included free.) The keyboard modification works only with *Format II*, however, and the package warns that "strange" things will happen if you run the program with game paddles plugged in. The program supports most 80-column cards.

If you need an inexpensive, easy-to-use program that displays text as printed, or if you need elaborate editing functions, look elsewhere. If you can make do with a print to screen preview of text formatting, any number of programs are superior to *Format II*. You can do a lot better for $150.

HEBREW WRITER

Davka Corporation
$75.00
(price includes a copy of the hi-res screen dump program *Zoom Grafix*)
48K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

Hebrew Writer is the ultimate in Hebrew language word processing. Using a set of Hebrew letters and vowels that are stored as hi-res characters, the program allows you to create and edit Hebrew text on the family of Apple II computers. The text, which can be a combination of Hebrew and English (these letters are stored as hi-res characters), is written one page at a time and stored on disk as a file to be dumped later to a printer. Alternately, the Hebrew and/or English text may be superimposed on a picture or graph that you have previously loaded onto one of the Apple's two pages.

You have a choice of two sizes of letters (small or large) for the Hebrew characters, and the text can be written with or without vowels. (With large letters, vowels are expected for each letter; however, you can skip them by depressing the space bar.) You are also

given the choice of creating white letters on a black background or the reverse, the latter being the default. All of these options can be mixed on a page. Hebrew text is entered with the cursor moving from right to left; English text the opposite way. In either mode, though, numbers, dates, and prices must be entered as they read from left to right (i.e., in the Hebrew mode, they would be input in reverse order).

The placement of the Hebrew letters on the keyboard follows the standard arrangement found on a Hebrew typewriter. (The layout of the Apple II+ and the IIe are slightly different.) Since no standard arrangement exists for the vowels, they have been arbitrarily assigned to the numeric keys (the uppermost row on the keyboard). A set of stick-on labels imprinted with the Hebrew letters and a cardboard strip imprinted with the Hebrew vowels are included. These, and a bit of practice, should turn your Apple II into a Hebrew typewriter.

The real power of *Hebrew Writer* comes from its word processing capability. A set of simple two-keystroke commands accessed by pressing the Control key plus the desired letter provides rapid and efficient editing of the text; for instance, tabs, adding and deleting characters and lines of text, inverse video, etc. However, since the editing is being done on characters that appear on the hi-res screen, one must be a bit careful when applying some of these commands. For example, when adding or deleting a large Hebrew letter, you must apply the corresponding command (CTRL-A or CTRL-D) on each line occupied by the letter.

As is standard in most word processing programs, a word wrap feature is provided that automatically moves incomplete words from the end of one line (cursor at the extreme left in the Hebrew mode) to the beginning of the next. This feature is relatively slow, particularly for long words, when compared to what you'd find on conventional word processors. This is to be expected, though, since you're working here on the hig-res screen and time must be allowed for the characters to fill in. Also, you should be aware that the wrap-around feature is *not* available in the large Hebrew text mode in order to prevent the your overwriting small text that may appear on the next hi-res line when you're mixing the two text sizes.

Clearly written documentation containing a tutorial accompanies the program. When printing, the authors suggest using screen dump program, *Zoom Grafix*, included in the *Hebrew Writer* package. Errors are handled by greeting you with a beep and offering you another chance. I encountered no program bugs after a thorough testing of the various options.

In summary, *Hebrew Writer* offers a capability not available with any other Apple software currently on the market. Although it perhaps is not as fluid and verstatile as its English counterpart, *AppleWriter*, this program does fill its purpose. If you need a program like this, you won't be disappointed with *Hebrew Writer*.

HOMEWORD

Sierra On-Line Systems
$69.95
64K; II/II+/IIe/IIc; language card

Overall Rating	A-	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B-	A	*Value for Money*

Homeword requires a 48K Apple, 64K language card, and a printer. Extremely user-friendly, this very basic word processing program proves an excellent choice for home use. If you know anything about word processing, you can sit down and operate the program. A cassette tape tutorial gently takes you through the basic functions. A total novice can become proficient in very little time.

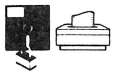
The program is entirely menu-driven and makes use of icons similar to those developed for the Lisa. The documentation, although clear, seems a bit skimpy on some of the more advanced functions. However, Sierra On-Line has a good customer service department with knowledgeable and helpful personnel to answer questions or guide you through a function step-by-step. Once you have mastered the program, and begin to find the icons a little tedious, the documentation provides a set of keyboard commands to bypass the icons.

Homeword allows you to search, search and replace, move, erase, and copy text, and combine files to produce a single document. A particularly nice feature, especially for novice users and those without an 80-column card, is the formatted page display in the lower right-hand portion of the screen. This allows you to see what your finished document will look like as you make additions and changes. The lower left portion of the screen displays page number, amount of free memory, and disk space available.

The print functions include the ability to view the document onscreen before printing, set starting page numbers, and select paper type. You can choose bold, normal, and underscored print styles, but you cannot use proportional spacing with *Homeword*.

Although very basic and with definite limits, *Homeword* is one of the easiest to use and most visually appealing word processors on the market. You cannot

copy the program, but you can get a backup copy for $10 from Sierra On-Line Systems.



LETTER PERFECT

LJK Enterprises
$104.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	B	*Value for Money*

Letter Perfect is a basic, easy-to-learn word processor. It offers a number of sophisticated features, but is also missing a few important functions. The most serious—possibly fatal—omission is the lack of a convenient text insertion, which I will comment on later. (*Letter Perfect* is worth considering for Apple II+ owners who can't use the newer programs that run on the IIe.)

A straightforward menu allows easy access to all editing, printing, and file management functions. Control commands offer a full range of cursor and text movement, deletion, search, search and replace, underlining, boldfacing, buffer creations and additions for block text moves, etc. You can also append any file on disk to text in memory, and lock files to prevent accidental overwriting.

Letter Perfect's most outstanding feature is its easy-to-use file merging for form letters and reports. You can select files from LJK's *Data Perfect* database program or from data files in *Letter Perfect* itself.

In the editing mode, you can embed text formatting commands allowing you to set variable margins and line spacing; center text; set headers and footers; use four fonts; justify margins; number and reset pages with optional alternating page positions; and add subscripts, superscripts, and other special characters. Multiple formatting commands can be entered on a single line, along with comments. If you have an 80-column card, you can preview formatted text onscreen.

The absence, however, of a convenient way to insert text in existing material is an aggravating drawback. You can insert a blank space or line, but the existing text does not move to the right to make room for new text. Even after you have made room and typed in the new text, the program does not tidy up the screen.

Letter Perfect's other weaknesses are minor by comparison. It lacks some sophisticated features, such as hyphenation, footnoting, indexing and creation of macro files (files which contain a series of oft-used commands which are accessed by a single command). Commands follow no logical pattern, making them more difficult to memorize than necessary. Fortunately, you only need to know a few commands to edit because the commands are in no logical pattern and are difficult memorize.

The manual is adequate but poorly organized; it should have a better table of contents, index, headings, and more type variety.

Letter Perfect supports all popular 80-column boards, provides an easy menu approach for setting up the program to run other printers, and can be used with a 40-column display and a lowercase character generator. Although only one disk drive is required, the program will support a dual drive system. Built-in configurations are available for the most common interfaces and printers, and for *Micromodem II*.

LJK will replace your first damaged disk for $10, but will charge $30 for subsequent replacements and backup copies.

MAGIC WINDOW II

Artsci, Inc.
$149.95
48K ; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B-	B	*Value for Money*

Magic Window II is an enhanced version of *Magic Window*, and offers a number of new features while retaining its ease of use. It is completely menu-driven, with subsystems for hardware specifications, formatting, editing, file maintenance, and printing.

This new version supports 80-column boards, the standard Apple 40-column screen, and a built-in 70-column video (though this, unfortunately, is extremely difficult to read). With any of these configurations, the screen scrolls horizontally to display lines of up to 160 characters. The program also supports "one-wire" shift key modifications and lower case adapters. If you don't have the lower case adapter, inverse video distinguishes upper case characters. A special disk lets you configure the system for your printer. You can easily use the program with either one or two disk drives, and it also supports hard disk drives.

Magic Window II visually formats documents. You can set page length, margins, and double or single line spacing through the system. Internal line formatting commands are for left, right, full, centered, or no justification. All internal formatting (columns, indenta-

tions, etc.) is set with movements on the screen rather than commands. Consequently, the monitor always displays text exactly as it will appear on the printed page. This technique, while sparing the novice the trouble of learning many new formatting commands and techniques, lacks flexibility and efficiency. You can't change the justification mode or sectional margins and columns without adjusting each line, and you must manually perform all indentations. You cannot simply instruct the program to apply previously established formats. A special command is required for titles, and you can only have one of each.

Relatively few control commands are required. *Magic Window II* assigns commands that are placed logically on the keyboard for easy learning and recall. You can search and replace, move (but not copy) text, repeat characters from one line to the one directly below, and generate special, non-keyboard characters and printer instructions with a control command. The program's main disadvantage is that it is oriented for line editing. When you create text, it will wrap down to the next line automatically. Once entered, however, text is handled in single line units, requiring you to rejustify each time you insert or delete. Even text movements are handled on a line-by-line basis.

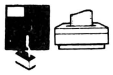
Magic Window II provides versatile file maintenance and manipulation. You can save, load, and list both formatted files (with estabilshed margins, tabs, etc.) and unformatted files. Because each line of an unformatted file is stored as a separate unit, you can load and transfer any portions you like for efficient and flexible merging with a formatted file. This feature also facilitates transfer of files created with other programs to *Magic Window II* for editing, and use of *Magic Window* files by other programs. Another good feature is the filer's direct access to DOS commands, so you can initialize disks, and delete, rename, and lock files without leaving the program.

The program handles all or part of a document, page numbering, multiple copies, soft copy for transmission through a modem, and creation of file lists for multiple file sequencing. Another nice feature is the ability to print files directly from memory without storing them on disk first.

The *Magic Window II* manual explains operations clearly, but its organization is poor. It contains tutorials at the end of every chapter. These work well in chapters covering only a few points, but in the editor chapter the exercises should really be used during the explanations, not afterward. The manual also lacks an index.

Magic Window II lacks some of the more sophisticated features (like automatic footnotes, hyphenation, macros, and built-in form letter production) of other word processors in the same price range, but it is a good selection if you want an easy-to-use program to to interact with other Artsci programs such as *Magic Mailer*, a form letter merging program; *Magic Words*, a spelling checker; and *MagiCalc*, a spreadsheet program.

Artsci, Inc. will replace damaged diskettes free of charge within the 90-day warranty period, or for $20 within one year. Back-ups are also available for $20.



MEGAWRITER

Megahaus
$99.95
64K; Apple II+ (16K extra)/IIe/IIc

Overall Rating	F	B	*Reliability*
Ease of Use	F	B	*Error Handling*
Documentation	B	F	*Value for Money*

An inexpensive word processing program should be easy to learn and easy to use. *MegaWriter* is neither. The program has a critical flaw: although almost entirely menu-driven, many of the menu options are not intuitively obvious. As a result, you must constantly shift from one menu to another (and sometimes wait for the program to refer to disk), even when you simply want to make corrections as you write. Infrequent users might be willing to make this trade-off if the menus eliminated the need for memorization, but *MegaWriter* is not simple. You still have to study the manual. Very cumbersome and unfriendly.

The main menu gives you a choice of three modes: Write, Print, and Organize documents on disk (which includes initializing, catalog, and other disk functions). Type "W" for write. The second menu allows you to create a new document or call up an old one. This done, the Write menu appears at the top of the screen: (A)djust, (C)opy, (D)elete, (F)ind, (I)nsert, (J)ump, (R)eplace, (Q)uit, (X)change. Type "?" and you get another string of command options. It won't be immediately obvious how these commands work, because each invokes yet another menu.

To begin writing, type "I" for insert and away you go. You will quickly notice, however, that *MegaWriter* behaves strangely in the Insert mode. The left arrow erases as it goes, but the other arrow keys type question marks. I can't see the usefulness of this. When you have completed a portion of your text, you type Control-C to get the program to "accept" it. This restores full cursor control. (Until you have done this, the delete key will wipe out everything you've written.) Now type "I" again to continue, or choose another menu option. Now *MegaWriter* gets cumbersome. To delete a word and replace it with another, for example, you place the cursor on the word, type "D" for "delete", then "W" for

"word," then Control-C to get the program to accept the change.

Even with these elaborate commands *MegaWriter* is inflexible. If you don't observe the program's convention of placing an extra line between paragraphs (as you wouldn't in double-spacing), for example, and then insert enough text in a line you've already written to push words onto the next line, the program will merge your text from that point on into a single paragraph (which, incidentally, is a royal pain to undo). It gets worse. Suppose, heaven help you, you need to type part of a letter—say the address at the top—in nonparagraph form. First you must turn off the wordwrap feature, or you'll get unpredictable results. Most likely, the address will wind up merged into a paragraph. To type the address requires the following string of commands: "S" for "set," "E" for "environment," "W" for "wordwrap," "F" for "false," Return to get back to the Write menu, "I" for "insert." Now you can type the address and enter Control-C for acceptance. Unfortunately, you also have to go back and turn wordwrap back on, which requires the same string of commands except that you substitute "T" ("true") for "F."

Ridiculous. I say forget it.

PEACHTEXT

Peachtree Software, Inc.
$250.00
48K; Apple II/II+/IIe

Overall Rating	B	B+	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	A	B	*Value for Money*

Magic Wand was one of the best CP/M word processing programs, but few stores carried it, or even knew anything about it. Peachtree bought it, renamed it *Peachtext*, and made significant improvements.

Peachtext includes virtually all usual functions available in word processing programs, yet it is easy to use. Excellant Help menus and a reference card are always available to walk you through the commands, although they do not appear unless called up. The manual is the best one I've seen. The self-instruction section uses screen display illustrations and concise descriptions to introduce each operation and command. A first-time user can become proficient very quickly.

Peachtree added a Main Menu, an important improvement over *Magic Wand*. From the Main Menu, moving among the sections of the program is as simple as a logical two-letter command: ED for edit, PR for print, MS for spelling (Magic Spell), etc. The program's printer functions are quite sophisticated. It supports boldfacing, superscript, and subscript, automatic page numbering, indexing, and onscreen format changes. Screen formatting provdes a visual representation of your printout's final appearance.

Many of *Peachtext's* specialized features include internal math, variables, and a GET command for inputting data and string commands are available. The manual includes clear examples of how to use these functions, which I found only occasionally useful.

Peachtext can be combined with the Peachtree spelling checker program and the mailing list program; both powerful additions to *Peachtext*.

No word processor is perfect, and *Peachtext* does have a few limitations. It comes configured for a specific computer and printer. First, if you change printers or 80-column cards, you must get the program reconfigured by a dealer or send it back to Peachtree. Second, the default values in the printer routine cannot be changed and are not set up for any normal document or letter formats. As a result, you have to add commands to every document. User-controlled default values would be a substantial improvement.

Peachtext is one of the most powerful word processing packages available for the Apple. Unfortunately, you may have trouble finding a store that carries it and is knowledgeable enough to provide a working demonstration. *Peachtext* is an excellent choice for anyone who needs to produce many high-quality documents with minimal effort.

PEN PAL

Howard W. Sams and Company, Inc.
$29.95
48K; II/II+/IIe/IIc, Franklin

Overall Rating	C	B	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	B	C	*Value for Money*

This low-priced word processing program is designed for easy home use. The chief difficulty in judging the merits of any new word processing program is the temptation to compare it to *WordStar* or some other top-rated, similar software. Any programmer's success in rivaling the more expensive word processing programs without additional hardware at a reasonable price depends on the product's usefulness. *Pen Pal* has some thoughtful features and a few good ideas. One of the nicest features is an Applesoft editor that allows you to edit your BASIC programs within the context of the

word processing software. The program also includes parameter settings for modems so that you can transfer data directly to and from the word processor. Another good idea allows you to exit the program into BASIC, execute BASIC commands, and reenter the program with either a Call statement or a simple Brun PP.

Unfortunately, despite its positive features I found *Pen Pal* confusing to use. The sometimes cumbersome command structure didn't bother me nearly as much as the way the program displays text. The manual claims that *Pen Pal* can display both 40-and 80-column text without special hardware, which is true, but the 80-column display doesn't all show on the screen. Instead, it scrolls across. The 40-column display has no formatting whatsoever. In the 40-column, or Thinks mode, you type whatever you want and the program inserts inverse characters to represent carriage returns and other formatting information. This results in a confusing mass of normal and inverse text with no apparent structure. Shifting into the Looks mode reveals the display as it will print, but in the 80-column mode described above neither view really allows you to see the final text exactly as it will print. *Pen Pal* does have a formatting command that reformats the text using inserted formatting information and the default configurations that you set up when you first use the program. This command allows you to reformat a document as often as you like.

The program allows for title headings, text centering, tabs, and temporary margins. It also has features to move and copy text, search, search and replace, block save, and move the cursor in four directions or to the beginning or end of the file. It possesses the unique feature of allowing cursor control via game paddles. I tried it with a joystick, but it didn't work well except for large scale movements. An additional feature, the Recover command, allows you to return to the spot where you left off typing after you edit or correct text elsewhere.

You can insert other special effects, like boldface or underlining, if you know the ASCII code for your printer. This requires some extra effort on your part and will hopelessly confuse most beginners. In fact, the configuration section of the program, although fairly thorough, really isn't simple or easily understood. I wish the publishers of user friendly software would include a clear, concise, and complete configuration section *at the beginning of the manual.* It took me nearly until the end of the manual to discover how to use the program with two disk drives. Why the configuration program doesn't have an option for two disk drives is beyond me.

Finally, since you can find several word processing programs for under $100, I suggest examining as many as possible before deciding which to buy. Try this rule of thumb: It is really user friendly if you don't need a manual to use it.

pfs: WRITE

Software Publishing
$125.00
64K (minimum); IIe/IIc; 80-column card

Overall Rating	B	B-	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B	A-	*Value for Money*

pfs:Write is quite easy to use, aimed at the person who has worked with a typewriter. Traditional word processors function differently, making it difficult for novices and occasional users. Allow me to explain. If you follow your training on a typewriter when using a word processor, you may find yourself buried in the directions trying to restore what the cursor just gobbled up, or attempting to get rid of extra letters. Most programmers have evidently forgotten that microcomputer users know how to use typewriters, not word processors. Not those who wrote *pfs:Write*. When you boot up, you feel like you've just turned the switch on a super souped-up typewriter. The screen looks like the page in a typewriter, and what you see is what you get—the page is formatted the way it will print. A scale at the bottom shows margins, tabs, and an extra cursor indicating cursor position. Repeating keys and the layout of the Apple IIe keyboard further enhance the feeling of using a typewriter. Here, trained typing generally results in no surprises.

When you finish a page, *pfs:Write* scrolls to the top of the next page. It can gobble and insert text by letters or blocks, and move sections of text to other parts of the document. It supports left, right, and center justification (but not full justification), plus headings and footings, but not automatic footnotes. Indeed, it has most of the features of a good word processor plus a few extras derived from its membership in the PFS family.

Drawbacks are minor. For example, when scrolling rapidly up or down, the cursor becomes invisible. When deleting rapidly using Control-R, lines do not scroll up as fast as the cursor gobbles text. As a result, you can gobble text two lines further down than you realize. A few suggestions: watch closely; wait for the program to catch up; or use a different command to delete large blocks. When inserting text, the cursor disappears again while the program tries to adjust subsequent lines. File names permit only fifteen letters and no spaces, but the documentation makes no mention of the forbidden spaces except in an obscure reference in

the error messages in Appendix A. The menus use rather unconventional tabbing and Control-C. The document files are not standard text files and cannot be read by any other word processors that I know of. In fact, if a disk loses its paper label and you insert it to run the catalog, it looks completely empty even when full of your documents. The Search function does not recognize a space as the last character in a string to be replaced, so if you want to get rid of a space in your document, you'd better figure out another way.

Some of the added benefits that come with *pfs:Write* because it belongs to the PFS family include integration, a hallmark of Software Publishing. The program will incorporate graphs from *pfs:Graph* into its printing process with selected printers (NEC, C. Itoh, Epson, Okidata, IDS and their clones, but not using Grappler or PKASO cards). It also incorporates and stores reports from *pfs:Report* into its framework. The program supports most printers, and recognizes and uses the 80-column board in the Apple IIe.

The package comes with two copies of the program and a sample disk. The company advises users of updates. It has a few technical flaws, but nothing fatal. I think it worth owning for the sheer ease of use, especially if you already own the rest of the PFS series.

SCREENWRITER II

Sierra On-Line Systems
$129.00
48K; II/II+/IIe/IIc

Overall Rating	B	B+	*Reliability*
Ease of Use	C+	B+	*Error Handling*
Documentation	C+	B+	*Value for Money*

Screenwriter II has been advertised as *the* program that offers all of the features of a professional word processing package without additional boards for the Apple.

The program works in both forty- and seventy-column formats. The format commands (40C and 70C) are hidden in the instruction manual; references to them do not appear until page 51. The default on booting up is forty-column mode, so you must remember to switch to seventy columns each time you use the program. Having a seventy-column rather than an eighty-column format is not a serious limitation. The standard typewritten page is only about sixty-five columns wide. The characters are generated on the program's graphics page, however, so they are not as crisp as those generated by an eighty-column card.

The manual is moderately well-written. The first chapter gets you into the program right away. However, some important information is hidden in the appendices, which are not referenced in the table of contents. These items include startup, diskette use and care checklist, printer test, and shift key modification. Each of these sections is well-written, and should be consulted prior to using the program.

Since there are no function keys on the Apple II/II+, multiple keystrokes are needed to accomplish many of the special operations that make for a powerful word processsing tool. On-Line Systems has made the multiple-stroke commands logical so they are easier to remember. Control-P advances the cursor one page, Control-B moves the cursor to the beginning of the text, Control-E moves it to the end of the text, and so forth. But once the obvious commands are exhausted, it takes some imagination to assign logical codes. The Command mode and the Insert and Change mode use different commands. For example, a Control-I in the Command mode allows you to insert text; yet this same command is a Control-C in the Insert and Change mode.

Cursor positioning is difficult. Control-A moves the cursor down the screen well enough, but there is no easy way to move the cursor back up. Escape and Control-A, when pressed at the same time, move the cursor to the extreme left before moving it up along the margin. (You can use a joystick like a mouse to move the cursor without the keyboard.) Editing in the seventy-column format is ridiculously slow; your buffered input gets far ahead of the screen display.

The command chart furnished with the program is well laid out and easy to read.

File management is unfortunately obscure and strange. When a file becomes too long for memory, the program saves portions in various places on the disk. Empty disk space should be at least twice the size of your text file to ensure a margin of safety.

Screenwriter II is a very powerful word processing package, adequate for occasional or medium use. It takes some getting used to and the manual is less than outstanding, but it's a good value despite its flaws.

STATE OF THE ART WORD PROCESSING

State of the Art
$395.00
64K; Apple II/II+/IIe/IIc

Overall Rating	D	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	F	F	*Value for Money*

At $395, *State of the Art Word Processing* is probably the most expensive word processor available for the Apple in its natural state. (*WordStar*, which requires a Z80 card, is so widely discounted that surely hardly anyone pays that much for it.) Since it costs twice as much as its most serious competition, I expected a fine program indeed. I was disappointed. According to the manual, its most remarkable feature is its integration with State of the Art accounting programs, which allows you to retrieve master file information from the accounting programs and insert it directly and automatically into documents that you create. I'll go the publisher one better. The program's integration with State of the Art accounting programs is the only reason to consider it.

The program's integration is a sort of super mail merge. It sorts any of your accounting files by as many as ten variables. You can, for example, write form letters to all of your customers with accounts receivable more than sixty days old, or with receivables of more than $100 and more than thirty days old, or both. These figures and more (the limitation applies only to sorting) can be inserted in your form letter automatically. Quite impressive. Unfortunately, also quite cumbersome. To create form letters from the seven accounts receivable on the sample disk, you must swap disks eight times (with two disk drives, the minimum configuration). As part of an integrated accounting system, it nearly screams for a hard disk. Not possible.

Word Processing was clearly designed for office use, such as secretarial tasks. It's nearly hopeless at composing text longer than short business letters. The program requires you to store text each time you complete a page, a maximum of eighty lines. It takes a good fifteen seconds to get from one page to the next—a serious nuisance. Even within a single page, *Word Processing* borders on dysfunctional. It is a screen-oriented program, which means that text appears onscreen more or less as it will print. Many people would consider this an advantage. However, when you scroll down, the cursor flits all over the screen. It's a little less active when you scroll up. Either way, you'll quickly outrun it if you hold down the arrow key. When you release the arrow key, the cursor just keeps going and going and going....

The basic editing functions contain other major flaws. The insert mode virtually disables wordwrap. To insert text, you must cut the line, then tell the program to fill in behind the insertion (five keystrokes already). It gets worse. As the program reformats text, it stops and asks if you want to continue every time it encounters a character (such as a dollar sign) that it thinks may be anything besides a letter, number, or punctuation mark. Very annoying. In addition, the cursor inexplicably leaps out to the left side of the screen and back every time you type a letter in the insert mode, making it virtually unusable.

Word Processing does offer all the important editing functions. It also supports underlining, boldface, shadow printing, superscripts, and subscripts. It does not support proportional spacing, however, and shadow printing won't work on an Apple Dot Matrix Printer. Because it's disk based, it allows you to create text files up to disk capacity regardless of the RAM you have. There is a tradeoff: The program slows the printer to a snail's pace as the computer constantly refers to disk.

Although the program is easy to learn, State of the Art apparently put more effort into the physical design of the manual—it's the most attractive I've seen—than into it's content. The manual is pedantic to the point of being an insult and poorly organized (it doesn't even have an index).

Word Processing's integration with State of the Art accounting programs might make it worth a look. As a stand-alone word processing program, it doesn't offer anything you can't get for half (or a quarter) of the price. It's one of the slowest and most cumbersome word processing programs I've used. As a stand-alone word processing program, I simply can't think of any reason to pay $400 for it.

SUPERTEXT HOME-OFFICE

Muse Software
$125.00
48K; Apple II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	D+	B	*Value for Money*

Supertext Home-Office is an upgraded release of a program that's been on the market for several years (previously called *Supertext 40,56,70*). Muse Software has added several improvements to the package, but has still not learned how to produce an instruction manual that is concise and easy to use. The files are now protected on disks that must be initialized by the program instead of standard DOS files.

Confusion is something of a problem with this program. A quick reference card included with the program is helpful, but it lacks organization. As with the manual, you must hunt for the information required to perform a task. The Apple II keyboard and its lack of function keys makes it necessary for most of the special editing and format functions to be performed using combinations of the Ctrl and/or Esc keys with other keys. For example, to lock the program into uppercase characters you use Ctrl-C; or to insert a block marker you use a Ctrl-V. Some of these are logical (and are therefore easy to remember), but many of them seem to have been picked out of the air. Logical commands include a "+" to indicate forward text direction, a "-" for backwards direction, an "L" to move one line at a time, a "P" to move one page at a time, and an "M" to insert an invisible marker that may be searched for (as when entering indexes or glossaries for documents). On the illogical side, you must remember that an Esc-/ moves you to the end of a file, and Esc-Return places you back at the top of the screen.

Supertext Home-Office is nevertheless one of the most versatile programs available for the Apple II. It includes most of the necessary word processing options, such as search and replace, page numbering, print headers, and user-definable characters. In addition, the program supports printers that will provide output with boldface, underlining, and the centering of text. The symbols used to denote these commands in the text are difficult to interpret, and certainly hard to remember during proofreading.

One advantage of *Supertext Home-Office* is that it can be used in three different column display modes: 40, 56, or 70 columns. This allows a first-time user to purchase this package and, without having to add an 80-column card, sit down at the keyboard and immediately get involved in word processing. As you progress, an 80-column card can be added, making the 70-column mode operational.

The program does not require a shift key modification, although it is supported and makes entering text easier. (Take heed, though, that this modification may void the warranty on your Apple. If you are already past the ninety-day warranty period, you have little to lose and much to gain from the shift key modification.)

It only takes about one hour to learn to use the program well enough to manage a standard letter, but it may take three hours or more to learn to handle a document of several pages. The program offers several special features, including the ability to design your own character sets. This lets you define and build your own character set, even using unique or foreign alphabets or characters not available on the standard Apple keyboard. The design process is complex, but you can store the results to disk for later use.

Another special feature, called Auto-Link, permits you to link several different files on multiple disk drives. This feature supports the Find and Replace, and Print and Load commands. It handles boilerplate documents, in which lines or paragraphs are put together to yield a polished final copy.

Overall, I found *Supertext Home-Office* a reasonably good product, offering enough power and flexibility for most word processing applications. Learning the program (once you get past the poor manual) is fairly simple and straightforward. A novice should produce quality documents within a short period of time using this program.

WORD HANDLER II

Advanced Logic Systems
$79.95
48K; Apple II+/IIe/IIc/III in emulation mode

Overall Rating	C	C	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	C	*Value for Money*

This is a simple, straightforward word processing program; its introduction claims that you will be doing useful work within twenty minutes of booting up the disk. The program is fairly easy to use, and easier to learn; it is filled with odd instructions, though, and its continually blinking screen is hard on the eyes.

The program displays 66 columns of text with no additional hardware. The characters are well-formed on the screen, although the "W" and several other characters are filled in, which makes them hard to read. In the 40-column mode, the program wraps lines longer than the screen will display.

The program has a number of quirks. For instance, to change printer specifications, it is necessary to hit the space bar while the program disk is booting up. If you don't, the printer defaults to the last specified. Some of the command keys make sense: Control-W, Control-L, and Control-P move the cursor by a word, line, and page, respectively. (Remember to use the arrow keys to indicate the direction.) Others seem to be completely illogical. When you use the command characters in different modes, they perform unrelated functions. This makes it difficult to remember their uses. For instance, when editing, the right arrow key moves the cursor one space to the right; when inserting text, this same key is used to indicate the end of the insert sequence. Control-L moves the cursor a line at a time when editing (it should be preceded by an arrow key to indicate which direction); in the insert mode, it adds a

half-space carriage return. Pressing the Escape key once changes the next character to upper-case; pressing it again moves the cursor to the next tab stop.

Word Handler II offers several nice features not generally found in Apple word processing programs. One, "form" document, sets up a document that requires fields to be completed. This is handy if you have forms that need to be duplicated often. When you call the file onto the screen, it asks for a document name and creates a new file. The old file, or the standard form, is kept intact. The program also prints small pages. The procedure is not easy, but the instructions are clear. With a little experimentation it is possible to end up with a document printed on both sides and folded like a small book. The program also allows full justification.

Both the manual and the instruction card are well-written, simple to follow, and easy to read. The manual doesn't make use of any screen illustrations. A beginner should be able to produce a usable letter or document after a few short sessions.

WORD JUGGLER

Quark, Inc.
$229.00
128K; III

Overall Rating	B+	A-	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	B	*Value for Money*

Word Juggler by Quark Engineering is one of the best word processing programs that I have used. Although not perfect, this extremely well-written product delivers as promised plus a little bit more. For $295.00 you receive two copy-protected disks (the original and a backup), keyboard overlay templates to tell you which keys perform what functions, and a manual in a standard sized notebook.

The program includes all the expected word processing functions, such as find, change, insert, overwrite, set tabs, and so on. In addition, *Word Juggler* has commands to change the tone of the printout by providing superscript, subscript, boldface, and underline; it will center or justify text in three ways; it sets the page width or length, and will set headers and footers. In addition to the normal word processing mode, the program offers a typewriter mode so that whatever you enter is printed out immediately. You can also set variables for fill-in-the-blank operations; predefined variables include one for page number and variables for the date and time in various formats.

Printer filters control printing. The package includes printer filters for a number of common printers, but you don't know until you open it whether the program supports your printer. You do get some documentation on writing your own filter (which requires you to have the Pascal III system with its Assembler), but the documentation is inadequate for anything but the simplest of filters. The program's second weakness crops up when you use the printer. *Word Juggler* does not allow you to embed printer control commands in the middle of a line (for example, to change the pitch of just one word in the middle of a line). The program also lacks split-screen editing. The final major omission: *Word Juggler* does not allow you to take advantage of the Apple III's changeable screen fonts, one of the III's nicest features.

If *Word Juggler* weren't copy-protected with only one backup provided, I would tell anyone looking for a word processor to look no further. As it stands, I cannot recommend it quite so heartily.

WORD JUGGLER IIe

Quark, Inc.
$189.00
64K; Apple IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

Word Juggler IIe is an outstanding word processing program for writers. It does everything you need with a minimum of fuss, and stays out of your way the rest of the time. It has a few drawbacks if you need elaborate text formatting capabilities, but most of them are shared by other Apple word processing programs.

Word Juggler IIe originally sold for $239, and *Lexicheck*, the companion spelling checker, retailed for $125. In the latest version, Quark has packaged the two together for $189—a price reduction of nearly fifty percent. The Apple III package sells for $229 without *Lexicheck*, which is $149 extra.

Word Juggler may be the easiest full-function word processing program on the market for the Apple IIe and Apple III. Commands are a model of simplicity, and there is virtually nothing to memorize. The program can be mastered in an hour or two.

Word Juggler comes with nineteen replacement keycaps, which are indistinguishable from Apple originals except for editing command labels on the front. These keys serve as function keys, invoked by pressing Control and the labeled key simultaneously. Delete Word, for example, is Control-W. When sequences of

commands are required (for moving blocks of text, for example), onscreen prompts point the way. The prompts appear unobtrusively at the bottom of the screen and do not get in the way after you have learned the program.

Commands on the Apple III version are performed on the numeric keypad. A labeled template that fits over the keypad is provided in lieu of the replacement keys.

Text formatting is equally simple. By pressing the Escape key, then one of the keys on the top row, you can set margins, justify text, change pitch, switch from single- to double-space and so forth. Both the IIe and the III versions come with a label strip that sits above the keyboard.

Editing and formatting commands are made in the Text Entry mode; unlike some programs, there's no jumping back and forth to menus or from editing to writing.

Disk operations—loading and storing files, reviewing the file catalog, disk formatting, setting default values, purging files, etc.—run off *Word Juggler's* Main Menu. Text remains in memory while all of these functions are performed (except loading a new file, of course). *Word Juggler* also allows insertion of DOS 3.3 or Apple Pascal files.

Despite its simplicity, *Word Juggler* is a powerful program. It has nearly all common word processing features. It performs page numbering, inserts headers and footers, and allows for variables in form letters. Any number of files can be chained together with consecutively numbered pages—even if the files occupy several disks. Blocks of text are easily transferred from one file to another with or without being deleted from it from the original. *Word Juggler* supports boldface, underlining, superscript, and subscript.

Word Juggler is character-oriented, which means that the text is not displayed onscreen as it will be printed. To my mind, this is an advantage for composition; it places a maximum of text onscreen with a minimum of clutter. With the print-to-screen function, which displays page breaks, page numbers, margins, double-spacing and so forth, you can display your entire text or select pages. If adjustments are needed, however, you must switch from display to text entry—not a serious problem for two- or three-page letters but a nuisance for longer documents.

Word Juggler has a few other characteristics I can nitpick about. It requires a keyboard enhancer that connects the keyboard cable to the game port. Installation is simple enough. (If I can do it, you can do it.) But if you use more than one computer, you've got a problem. One user complains that some of his replacement keys sit higher than others, but I have installed two sets without encountering that problem.

You cannot embed some printer commands such as change pitch in the middle of a line. There is no provision for italics, indexing, or tables of contents.

The instruction manual is generally easy to follow. There are a few lapses, however. For example, "WARNING: If you are using a printer which is capable of micro-space justification such as the Apple LQP, Qume, Diablo, etc., you must not configure your printer interface card to handshake using the ETX/ACK protocol." The tutorial is clear for the most part, although it's a little muddled on page numbering and other variables. And it takes longer to read the tutorial than to learn the program.

On balance, *Word Juggler's* simplicity greatly outweighs its niggling drawbacks.

Lexicheck is a straightforward spelling checker with a 50,000-word vocabulary. You can create a custom dictionary of 3,000 words on the same disk. An 8,000-word legal dictionary is available separately.

Learning *Lexicheck* takes about ten minutes. It scans your text (about thirty seconds for a 1,000-word document), then gives you a word count, and the number of unrecognized words are displayed on a prompt line and highlighted in the text.

Lexicheck is useful, but limited. A large number of perfectly ordinary words are not included in its dictionary while several of George Carlin's seven forbidden words are. It also inexplicably contains the past tense of some verbs but not the present. As a result, you have to review a lot of correctly spelled words. In a few days of using *Lexicheck*, incidentally, I encountered two spelling errors in the dictionary—"pentnhouse" and "cavaliere."

Personally, I'd prefer to have the Carlin words flagged. It's not that I find them objectionable; I just don't want them to turn up unexpectedly when I'm trying to type "shirt" or "duck." I usually don't use them when I'm writing.

The package comes with two copy-protected *Word Juggler* disks and one copyable *Lexicheck* disk. Quark promises to recopy the *Word Juggler* disk for $10 or replace it for $20 if it should fail after the ninety-day warranty expires. Quark also promises free replacements in the event of software corrections but makes no written references to the substantially revised editions.

Word Juggler is an excellent word processing program—in fact, I use it every day. Academic or technical writers might choose another because they need a special function, such as footnoting, or a secretary might opt for a program that displays text onscreen as it will be printed. But, for general-purpose writing, *Word Juggler* is highly recommended. And even if *Lexicheck* is somewhat less than overwhelming, the package is an excellent value.

WORDSTAR Version 3.3

MicroPro International
$350.00
64K; Apple II/II+/IIe/III

Overall Rating	A-	A-	*Reliability*
Ease of Use	C+	B+	*Error Handling*
Documentation	B+	B+	*Value for Money*

WordStar is the best-selling word processing program on the market, and it is often cited as the standard by which other programs are measured. Although it deserves most of the praise bestowed on it, *WordStar* is not for occasional users. Because it is so powerful, it is difficult to master, and infrequent users tend to forget what they have learned between sessions.

WordStar is one of the most expensive word processing programs available for the Apple. An additional investment in a Z80 card and a CP/M operating system is required; fortunately, these are often discounted. Since the program comes in different versions for various computers, you must be certain that the version you buy is compatible with your system and then install it.

WordStar repays your investment with power and flexibility. It's a screen-oriented program, which means that the video display is the same as the printout except for underlining and boldface type, which are indicated onscreen by control characters. In versions after 3.0, you can display text up to 240 columns wide, with scrolling in 40-column increments—useful for extended charts and tables.

Despite the program's complexity, you have to try hard to go astray. The onscreen Help menu is very thorough, and as you become familiar with the program, you can make the size of the menu smaller until you finally eliminate it completely.

All standard cursor movements and editing functions are available, and then some. The cursor is moved with Control and letter keys arranged in a diamond (E-S-D-X). The cursor can be moved horizontally by word and by line or by page vertically. You can insert and delete by character, word, or line. Blocks of text can be moved or deleted and you can transfer text from one file to another, setting return-to-place markers to help you to get back where you started. The search and replace function is flexible and can be performed once, repeatedly, or globally. Selective replacement (under operator control) is also available.

As the text scrolls down, the preceding line is formatted as it will print, so you can see how the finished text will look. For each paragraph, you can change margins, line spacing, or justification—or just "clean up" after editing. Optional hyphenation is available, and *WordStar* suggests where to place hyphens. You can accept suggestions, place hyphens elsewhere, or force an entire word to the next line. If you insert a hyphen and later rearrange a paragraph, the hyphen can be removed without disturbing justification.

The spooling function lets you continue working at the computer while you print a file saved on disk. Embedded print commands control margins, headers, footers, superscripts, subscripts, variable pitch, shifts in ribbon color, and page numbers at any location and beginning on any page. Page ejects may be automatic or forced. Text is justified by spacing between words or by microjustification of 1/120 of an inch, provided your printer supports the latter.

The instruction manual is extremely complete and clearly written, especially considering *WordStar's* complexity. (The Help screens are so thorough, however, that once you've become familiar with the program, you will seldom refer to the manual.)

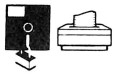
WordStar does have some significant drawbacks in addition to its complexity. Text is stored on disk as you go along. This means you can create larger files than with most other Apple programs (and eliminates the need for 128K.) The process of going to disk as you scroll through a long file is exasperatingly slow, however, and you run the risk of losing a file entirely if it is too large for the space remaining. *WordStar* salespeople say the program is best suited for short documents, such as two- or three-page business letters.

The program is also slow to move between commands, especially if full Help menus are left on the screen. Speed typists will discover a delay in video display as they return to typing after invoking a command; several letters, or even a complete sentence, may be lost. (Slow, of course, is a relative term; even a three-second wait can be frustrating once you get used to a speedy computer.)

Indentation, aligning text in columns, and right justification are all commonly used in business but awkward on *WordStar*. If you set indentations and line lengths, but forget to reset margins, for example, everything will be rearranged to reflect the previous margin setting. Text alignment is difficult with a proportional spacing printer. Unless you force a hard space after a column, *WordStar* uses different spacing increments, and the result will look ragged.

Finally, *WordStar's* commands are unnecessarily complicated and make no intuitive sense. The sequence for moving a block of type for example is: Control-K-B to mark the beginning of the block, Control-K-K to mark the end, and Control-K-V to insert it elsewhere. Control-G deletes a character, Control-T a word, and Control-Y an entire line. People who use the program regularly become accustomed to the commands, but they are more difficult to learn than those of most other programs.

All in all, *WordStar* is a superb program. It is versatile and, once mastered, easy to use. Coupled with *MailMerge* and *SpellStar* (q.v.) it is one of the most powerful word processing programs available for Apple. Since *WordStar* is available for so many computers, it has almost become a universal standard. Once you've mastered the program on Apple, you could probably produce a finished document on another machine with little retraining. A wise investment.



WRITE AWAY Version 5.4

Peregrine
$119.95
64K; II/II+/IIe with 16K card/IIc
80-column card recommended

Overall Rating	B-	C	*Reliability*
Ease of Use	D+	B	*Error Handling*
Documentation	C+	C+	*Value for Money*

I think I was spoiled by coming late to Apple word processing programs. The earliest programs, such as the original *Apple Writer*, were cumbersome and feeble. Then programmers began adding more features, complexity be damned. Only with the introduction of the IIe in early 1983 did slick, powerful, and easily used programs begin to appear. *Write Away* falls into the middle group. It's the most complex and difficult of the eight or ten Apple word processors that I've used, followed closely by *MegaWriter* (see review elsewhere). After fooling around with it, I've only scratched the surface of its intricacies. Nevertheless, *Write Away* repays the effort with almost every function that a word processing program can possess. Whether that's a fair trade is a matter of personal preference.

The list of what *Write Away* will do is impressive. You can define numbers one through eight to execute any command, overcoming the frequent complaints about the lack of function keys on the Apple. You can chain commands to execute a series of functions in one step, creating a macro command to repeat chained commands throughout the text or a given number times. This allows you, for example, to execute a global search and replace. Embedded dot commands (similar to those used by *Apple Writer*) take care of text formatting. For example, to set the left margin at 10, type .LM at the top of your text. You can also set margins and other type formatting options by redefining default values. The program supports boldface, underlining, superscripts, subscripts, and a variety of type fonts. If you're familiar with BASIC commands, you can do still more things.

If you use an Apple IIc or IIe with DOS 3.3 and an eighty-column card, you can use *Write Away*'s RAM disk. RAMDRIVE 3.3 leads all of the *Write Away* system into the eighty-column card's extra memory, making execution much faster. Data files are stored in a RAMdrive assigned to slot three.

In addition, *Write Away* comes with a module that allows you to use it with a modem for communications. (Peregrine claims that it's the first program to integrate word processing and communications.) A mailing list module interfaces with a number of popular mailing list and database programs. You can use conditional (variable) text commands to generate form letters. A special "Keyboard entry" mode turns your computer into a typewriter without affecting your work. That means you can stop in the middle of writing a letter to type the envelope, or a memo, or a note to yourself, without opening a new file.

Pretty impressive. Unfortunately, all of this is neither easy to learn nor especially easy to execute. Some users may find the program's two glaring flaws altogether unacceptable. First, *Write Away* has separate text entry and editing modes, forcing you to switch back and forth as you write. Although not an uncommon feature, it is a nuisance. The second flaw is more peculiar. When you insert text (or if you get your line length out of whack with your default margins), *Write Away* extends your text into the margin rather than wrapping it around to the next line. When the cursor is on such an extended line, the words appear on subsequent lines, but when you move the cursor, the words in the margin disappear and are indicated only by a "+" at the end of the line. You can realign the text with a simple command (once you find it in the inadequately indexed manual), but the whole process is very odd and cumbersome.

Write Away is almost entirely command driven. It has no menus beyond the main menu and no onscreen prompts. This forces you to memorize a large number of commands or continuously refer to the manual, reference card, or Help screen. They aren't simple. For example, a global search and replace to substitute "fatherhood" for "motherhood" requires the following commands: MGmotherhood[esc]=Cfatherhood[esc] [esc], B/T[esc] [esc]. A selective search and replace requires six steps (too long to outline here). When you split up the global search and replace command, it's not so bad. You're telling the computer to define a macro, find (get) motherhood and change it to fatherhood. The double escape completes the definition of the macro. Then you tell the program to go to the beginning of the text and "take" the macro, with the slash indicating all occurrences.

Well, you can learn almost anything if you use it enough. Unfortunately, here the organization of the onscreen tutorials and the manuals make the learning process more difficult. Both start out teaching you commands in the editing mode and throw so much information at you that it's difficult to absorb. I didn't learn to use the program until I chucked the tutorials and started writing, looking up commands as I went.

Write Away is a powerful word processor. Once you get the hang of it, you learn to control its quirks and writing becomes reasonably smooth. However, there's no way around the separate edit/write modes or the peculiar trait of pushing inserted text into the margin. Experienced computer users may find the power worth the trouble, but I wouldn't recommend the program for novices.

THE WRITE CHOICE

Roger Wagner Publishing, Inc.
$44.95
48K; II/II+/IIe/IIc; 80-column card optional

Overall Rating	B-	B	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	B	B	*Value for Money*

The Write Choice, a word processing package, consists of several parts: the Write Choice word processor, Tut's Typer, The Word Processing Style Manual, and The Analyst. Basically, the package introduces you to word processing, yet it has features that can handle an overwhelming majority of normal word processing requirements.

The actual word processing program, The Correspondent, offers features such as find, replace, insert, delete, page numbering, and formatting. It also includes linking and merging of documents, plus Help screens. (Many of the word processors in this price range don't offer most of these features.) Once the program has begun, the screen keeps you informed as to what page, line, and column you are working on and in what mode (Edit, File, etc). The program lacks only Menu selections to match state of the art competitors. The Correspondent requires you to learn two-key commands known as Control Commands, which, while not difficult to master, may cause the novice some aggravating moments.

Tut's Typer is a tutorial designed to teach you or enhance your typing skills. The tutorial section allows you to choose the portion of the keyboard with which to work. You begin by typing the characters the program presents. At the end of the drill, you learn how many mistakes you made. When you feel that you've mastered the keyboard, you can enter Tut's Tomb, where you enter words as they appear in a maze. Again, at the conclusion of the game you learn your score in the form of speed, accuracy, your fastest keys, and your slowest keys. I thought that this section alone justified the price of the whole package.

The Analyst, a special utility program, determines the readability value of a document. It displays the number of words in a document, the average word length, the number of sentences per 100 words, the number of syllables per word, and the minimum grade required to read the file. Educators may find this portion of the package invaluable.

The Word Processing Style Manual, a paperback book, provides a reference manual for The Correspondent as well as for proper style and format for business letters, manuscripts, outlines, etc.

The Elements of Style is exactly the same book as that used in colleges across the nation as a guide to correct grammar and content for a wide variety of written documents.

As a general word processing program and typing tutor, *The Write Choice* is a good value and worth considering if you're just entering the world of word processing.

ZARDAX

Action-Research Northwest
$210.00
48K; II+/IIe/IIc; Franklin

Overall Rating	B+	A	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B-	C-	*Value for Money*

Zardax is a powerful yet easy to use word processing system for the Apple computer. The program has all the capabilities required by most users, and yet is simple enough for you to use most of the program's features without spending a lot of time studying the manual.

The *Zardax* system requires a 48K Apple II+/IIe/IIc with at least one disk drive. Two drives will eliminate disk swapping. Also required is a hardware modification to the Apple to allow you to use the actual Shift keys on the Apple keyboard to access uppercase characters. The package includes the needed information and supplies, although Apple users who have a Videx Keyboard Enhancer don't need to make this modification. *Zardax* does support most printers and interface cards currently available for the Apple II, but the manual mentions some interface cards that may require

special drivers to bypass the interface card's firmware. Other optional hardware includes a 16K RAM card installed in slot 0 so that the user can work with much larger documents than would normally be possible, and an 80-column card installed in slot 3 which enables the user to view a full 80 columns of text on the monitor as opposed to the standard 40 columns.

There are basically two types of word processors available. The first is a command driven system, in which you tell the program specifically what you want to do. The other type is referred to as a menu-driven system, in which all of your options in any particular section of the program are displayed and you simply make the appropriate choice. *Zardax* is a menu-driven system which makes the program easy to use for newcomers.

Word processors, in general, are frequently divided into two distinct sections. The first you encounter is the Editor where your text is entered and manipulated to your satisfaction. The second major portion of the program is the Printing/Formatting section. This portion of the program takes the text that was entered in the Editor and sends that text to a printer in a manner that you have described. One nice feature in *Zardax* is a function called Videoprint. This option allows you to view your formatted document onscreen and make changes in your text before sending it to the printer, which saves paper and printer time.

The Editor

Since most of the time you spend using a word processor is spent in the Editor, it is important that it be simple to use and very straightforward. The authors of *Zardax* have done a very good job of this. The Editor (as well as the rest of the program) uses the Apple's Hi-Res screen. This allows the program to display both upper- and lowercase characters without the need for a lowercase adaptor. If you are using an 80-column card, the program uses the card's character set.

When you are entering text in the Editor, it is not necessary to hit the Return key except at the end of paragraphs. The program automatically wraps words around to the next line if you have reached the fortieth column of text (the eightieth column if you are using an 80-column card). The one drawback is that *Zardax* does not break the line at the end of a word. If you reach the final column of text in the middle of a word, the portion of that word which will fit on the current line is placed there, and the rest is fitted on the next line. Not to worry, though. When documents are printed, words which may have been split in the Editor appear properly on final printout.

The editing commands are quite logical. To move the cursor you use control sequences; for instance, Ctrl-D moves the cursor down one line, Ctrl-U moves the cursor up one line. The rest of the commands are equally well thought out and include left and right movement, movement up and down through the text in ten line increments, and direct movement to the beginning or end of your document, as well as movement to preset tab stops.

Advanced Editing Features

Some of the other Editor features allow you to do much more sophisticated text editing. One useful extra is the Search and Replace function. This feature is found in most word processors, but the extra fillip here is what is known as the Verify function. Each time the program finds the word or phrase that you want to replace, you will be asked whether you wish to replace it in this particular context. This allows for selective replacement inside your document. Another good touch is that with two keystrokes the current paragraph that you are working with can be moved above or below the following paragraph. This is a very simple process for what would normally be a complicated "Block Move." Still another feature available in the Editor is the Insert command. This allows you to insert text not just from the keyboard, but also from files that have already been saved to a disk. Other Editor functions include character deletion from either the right or left of the current position, and deletion of large blocks of text. All in all, the Editor section of this program is very simple to use, and complete enough to handle almost any editing task.

Formatting Your Document

Control of your document's appearance is handled by embedded formatting commands. These commands are two letter sequences preceded by a Ctrl-O. These commands control such things as page length, form length, line length, justification, page numbering, headers and footers, centering of text, the length of paper, and many other items too numerous to mention here. Many of the other available commands are printer related, and can be used if your printer is capable of performing these operations. These include single or double width characters, boldface characters, changing the pitch of the printer, super-and subscripting, and switching back and forth between red and black ribbon. One final formatting feature that I have not seen in any other word processor, Apple or otherwise, is the ability to program up to seven of your own formatting commands depending upon your printer's capabilities.

Printing Your Document

Once your document has been entered in the Editor, all appropriate changes have been made, and formatting commands (if any) have been added, it is time to print it. You have several options when you want to view your final product. You can view it on the screen prior to sending it to a printer (as previously described using the Videoprint option), use the Draft option which will automatically print one copy of your docu-

ment, or use the Print option for final output. When this option is chosen, you will be asked how many copies of the document you wish to print, and, if it is a multiple page document, which portion of it you would like to print.

The documents produced by *Zardax* are first-rate. The justification is very good, and with a little experimentation with the formatting commands, you will find it is very easy to create professional looking documents in a very short period of time.

Documentation

The documentation supplied with *Zardax* is excellent in some places, and lacking in others. It is almost as if two separate authors wrote the manual. Fortunately, the good portions of the manual are the examples and tutorial section. The documentation gets very vague in the more advanced sections, such as the section describing printer drivers. On the whole, however, the documentation is more than adequate for ninety percent of the users of the program. The strong point is its tutorial.

When all is said and done, *Zardax* is an excellent program.

ZARDAX III

Action-Research Northwest
$210.00
128K; III

Overall Rating	B	A	*Reliability*
Ease of Use	C+	B	*Error Handling*
Documentation	A	B-	*Value for Money*

This word processing program includes many of the features that I have long desired, among them the capability of reading and writing Pascal text files as well as ASCII files, formatting a disk (other than just the one in the built-in drive), and the ability to handle extremely large files. In many ways it blends some of the best features of top competitors. It also includes some nice features they don't support, but unfortunately, it doesn't always implement features in a convenient way.

Zardax III suffers somewhat in the category of visual appeal. The Main Menu looks extremely crowded and disorganized (although it improves upon the menu for the Apple II version of the program). When you have your document on the screen, you get a true wrap-around rather than a word-wrap. By this I mean that words break in the middle as you continue to type rather than remaining whole. This becomes particularly troublesome when a word ends at column 80 on your screen because this leaves a blank space as the first character of the next line.

Ease of use also presents some problems. Although I didn't find the program particularly difficult or easy to learn to use, I found it hard to remember the command structure between times because the commands differ from any of the other word processors that I've ever used. I had particular trouble adjusting to using two-character codes for files rather than simply using the file name. Now, after having used the program for some time, I feel that even though I can't work with it as easily as with other word processors, I can exercise its capabilities fairly thoroughly.

The documentation makes up one of the program's strengths. It is complete, well written, and full of helpful hints (such as a section on what you should look for in a database or communications package if you want *Zardax III* to access the information). In addition, Action-Research Northwest offers excellent customer support. The people there know their product and go to great lengths to help you use it to its best advantage. When you send in your registration, they keep track of the information and notify you of updates as they become available, either to the program (not frequent) or to the printer parameter file as it supports new printers. Some updates are even available via telecommunication lines.

Zardax III does have a couple of weak points. Most notably, you are always in the insert mode, which means you cannot type over existing text—you must delete the old and insert the new. Moreover, as the paragraph gets longer, cursor operation starts to slow down when using the arrow keys. The arrow keys have a nasty quirk also, in that you cannot move vertically but instead must go up to the right end of the previous line or down to the left end of the next line. To get to the middle of the previous line, you must use the left arrow key to move about forty spaces. Very annoying.

Some of the features that make *Zardax* attractive to me are files that extend up to 197K (on a 256K machine) and operation with Pascal text files when the need arises. Yet another nice feature provides a glossary capability with more potential than competing word processing software. While this program has not become my favorite for word processing for the Apple III, I will continue to use it for some applications, such as changing ribbon color for part of a line while printing.

Zardax III is a good word processing program, especially for large files, and you should seriously consider its capabilities.

Word Processing Accessories

THE BANK STREET SPELLER

Broderbund Software
$69.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

The Bank Street Speller is an elegantly simple spelling checker for *The Bank Street Writer*. It's fast, accurate, and easy to use. No muss, no fuss. Excellent.

To use the *Speller*, you save your text to disk, boot the spelling program, and select Check Spelling from the menu. If you have two disk drives, the text disk goes in drive 2 and the dictionary goes in drive 1. With one drive, you have to swap. Adding words to the dictionary requires two drives. After the program checks your text, it gives you a word count and offers the option of printing out an alphabetical list of the unduplicated words in the text (why?). The program highlights each unrecognized word and gives you the option of changing it once, changing it everywhere it appears, or ignoring it. It also suggests possible alternative spellings. A dictionary search feature permits wildcard searches. A search for "appear?nce," for example, yields the correct spelling. The equal sign (=) is a multiple-letter wildcard. A search for "w=d," for example, produces a list of all words that begin with "w" and end with "d."

Sensible Software, makers of *The Sensible Speller* (one of the best spelling checkers around), developed *The Bank Street Speller* for Broderbund. You can copy the program disk once and the dictionary on the flip side as often as you wish. The forty-page manual is so simple to use that you may never read past the two-sided "quick start" card.

The Bank Street Writer is a very easy-to-use but rudimentary word processing program, best suited for youngsters and light word processing by adults. If it meets your needs, *The Bank Street Speller* complements it excellently. Highly recommended.

THE DICTIONARY

Sierra On-Line Systems
$99.95
48K; Apple II/II+/IIe

Overall Rating	C	C+	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	B	*Value for Money*

The Dictionary is a spelling checker containing 28,000-words for use on the II/II+ with *Screenwriter II*, *PIE: Writer*, or *Apple Writer II* files. If embedded control characters are ignored, it should work with any word processor that saves standard DOS 3.3 files.

The program is protected, but the workbook disk can be copied and modified. A spelling checker is only as good as its dictionary, and, while 28,000 words are only a small portion of the English language, this number is adequate if you add a personal 3,000 word dictionary. The program will recognize contradiction; however, many plurals and adverbs are not recognized. Also, the dictionary doesn't contain such common words as "cat" or "awed." You can create many wordbook disks, use dictionary copies for different applications, and list the entire dictionary on a line printer. (The listing is about 130 pages long, and can't be printed in sections, so if you want a listing, plan to go out for the evening while it's printing.)

If you use the program with one disk drive, you have to swap disks every half page of single spaced text. This is annoyingly slow. With two disk drives, it takes five minutes to process five pages of single spaced text and print unknown or misspelled words. The automatic mode offers only a list; it doesn't show the location of the problem words. It's too bad that the text file can't be marked while the printout is generated.

In the prompt mode, you can either ignore the word, mark it as misspelled, or add it to the dictionary. The flagged words are shown in context in a two-line window at the top of the screen. You can correct misspelled words within the file if you have a dual drive system.

I found the program useful for locating obvious spelling errors. However, the regular dictionary flags

so many words that I spent considerable time using a dictionary to make sure I had spelled the words correctly.

Overall, I would recommend this prgoram to anyone doing a substantial amount of word processing, provided you two disk drives. Although it is not the best or the fastest spelling checker, it is the least expensive.

MAGIC WORDS

Artsci
$69.95
48K (64K recommended); II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	C+	B	*Error Handling*
Documentation	C	C	*Value for Money*

Magic Words was copyrighted in 1981 and it shows its age. Published as a companion spelling checker for Artsci's *Magic Window* word processing program, *Magic Words* has simply failed to keep pace with other spelling checkers on the market, changes in the Apple, and even changes in the *Magic* series.

Magic Words is not without redeeming factors. Designed to work with any text or binary files created by a word processor, the program comes equipped with a 14,000-word dictionary expandable with a RAM card to include several thousand more words (12,000 characters). You can set the program to operate in an unattended mode which automatically identifies and marks all words not found in the dictionary. You can subsequently check the dictionary at your leisure. In the attended mode, you can correct spelling on the spot. Unknown words appear in context, which you can vary from 25 to 254 characters in length. You can also call up a printed list of errors, page numbers, line numbers, context, and total number of document words.

The subsystem menus of *Magic Words* should look familiar to people who own other software programs from the *Magic* series. Different options allow you to operate the spelling checker, manage files, configure the program to fit your hardware, and define page formats for printed reports. The menus are not as convenient as those of the newer programs in the series, making what should be a straightforward operation complex. Likewise, the documentation abounds in anachronistic references and makes no mention of the Apple IIe. You must accommodate for the differences between the IIe and earlier generations of the Apple.

Finally, screen displays are confusing and the dictionary seems puny by current standards. Although only a few years behind, *Magic Words* just can't match the competition.

PEACHY WRITER

Cross Educational Software
$24.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

This is a line oriented text editor. It is not a word processor, but it may be used as an educational tool to introduce people to word processing. It is very easy to use, and is powerful enough to be used with any age group. The operation of the program is menu-driven, and the various functions are well prompted. Students will be able to use this program with a minimum of instruction.

Peachy Writer is released in DOS 3.3, but it also comes with a de-Muffin program to use a DOS 3.2 disk if you have an older system. Instructions are included on how to accomplish this.

On startup, you are given the option of using the "Big Print Text Editor" or the normal *Peachy Writer*. In the "Big Print," all the letters are done in graphics and large size. This mode would be particularly useful in the lower grades. All functions work the same in both editors. "Big Print" works slower because it must create the graphics characters.

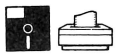
All text displays are uppercase, but the actual text that is stored is lowercase. To enter an uppercase character, the letter is preceded by a "/." There are only four other formatting commands in addition to the uppercase command. These will set the column width of your text, indent five spaces, indent to the center of the page, and center the line. You can enter Escape codes, and, as most printers use Escape sequences to perform their various functions, you can have full control of your printer.

When editing, the standard Apple "Escape-I/J/K/M" sequence is used for cursor movement. The program will also recognize the older "Escape-A/B/C/D" sequence.

When you are ready to print out a file, there are several print options for various types of printers. You may also obtain a print to the screen. However, if you have formatted for an 80-column page, you will not see your text as it will be printed out. *Peachy Writer* is written in Applesoft and then compiled into Machine language. The Applesoft program is still provided and

may be modified and run as is. This will be a slow running program, however, but this may be preferable if it allows you to customize the operation to go with your specific printer.

I talked to the publishers about modification of the program for specific printers. They said that if I provided necessary codes, they would be willing to tell me how to modify the program. They indicated that running the source would be slower, but said that, if sent the modified source, they would compile it and return it.



SENSIBLE SPELLER IV

Sensible Software
$125.00
48K; II/II+/IIe/IIc/III in emulation mode

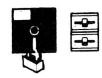
Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Think of the *Sensible Speller IV* as an electronic dictionary that helps remove embarrassing typos from your writing. The program collects all the words from your manuscript in the Apple's memory, counts them, lists them, checks them against the dictionary disk(s), displays those words that don't match any dictionary used, offers alternative spellings using similar words from the dictionary, and fixes the misspellings in a disk file copy of the document. You control all phases of the process. The program can ignore proper names, numbers, and embedded word processor commands.

If you have two disk drives you can add up to 10,000 words to each dictionary disk and create any number of custom disks. With only one disk drive you can use only the dictionary disk that comes with the program. Drawn from the *Concise Edition of the Random House Dictionary*, it contains 80,000 words. The program allows you to use a hard disk by asking you to specify slot, drive and volume, and an alternate RWTS routine. It also allows you to define your own acceptable character sets for the various European alphabets.

Sensible Speller IV works with most word processors with the notable exceptions of *Easy Writer*, *Easy Writer Professional*, and *Incredible Jack*. The CP/M, Pascal, and *Word Handler* special versions do not suggest correct spellings of words or allow immediate correction of misspellings the way the DOS version does. The program also stands alone as a word finder. You can retrieve a word or sets of words which meet certain spelling criteria. For example, if you request words that match "L???R," you get "labor," "lamer," "laser," "later," "loner," and so on. For "P=LL=ER" you get "painkiller," "pallbearer," "pollster," and so on. The wildcard characters ? and = stand for a single letter and any number of letters, respectively.

The package comes with two protected program disks (including a backup copy) and one data disk. This version is a welcome improvement over the original, which I have used for two years. It flows smoothly from one point to another, anticipates your responses by providing default answers, and requires fewer disk swaps. I thought *Sensible Speller IV* outstanding.



SPELLSTAR

MicroPro International
$99.00
64K; Apple II/II+/IIe; *WordStar*

Overall Rating	B+	B+	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	C+	B+	*Value for Money*

SpellStar, an excellent program, makes a fine addition to *WordStar*. Nonetheless, there are a few things you should know before buying the program. First, you must have two disk drives to run the program, one for the disk with the text file and one for the dictionary. A third drive supports the program disk, but is not required because you can exchange the program and dictionary file disks when necessary.

In the simplest terms, *SpellStar* processes your text file, sorts the words to another file while eliminating duplicates for optional inclusion in the dictionary, merges the sorted list with the dictionary and checks for matching words, and flags all words not in the dictionary. These words, correct or incorrect, are then examined for spelling errors or inclusion in the dictionary. Since some forms of the same word (plural, possessive, present tense, past tense, etc.) occur in the dictionary's 20,000 word vocabulary, the same word may appear on the screen in several different forms.

At this point, the sorted file is read. You have the option to specify that the program stop for each flagged word. When it does, you can ignore, fix, or set aside the word for later inclusion in the dictionary. If you choose, you can even make a supplemental dictionary of special terms. You make corrections under *WordStar*'s control, with all of its editing features. You can alternate between *WordStar* and *SpellStar* as needed. You can update the dictionary at any time by adding or deleting entries, or create an entirely new dictionary.

A word of caution seems called for. Since *SpellStar* takes your document apart, its work files are the same

size as the document itself. In using the program, you would be wise to format a separate disk for the text file you want to work on and PIP (transfer) the file to that disk. This avoids the problem of running out of disk space (except for very large files, which you can split into smaller files).

SUPER SPELLGUARD

Sorcim
$49.95
32K (minimum); II; Z80 card

Overall Rating	A-	A-	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A	C+	*Value for Money*

Super Spellguard is the latest version of one of the pioneer spelling checker programs for microcomputers. It provides a fast and easy method to correct spelling and typographical errors in the text files produced by the most popular word processors for Apple CP/M. To do this, the program scans through your entire text file and tries to match each and every unique word with an entry in its dictionary. Naturally, not all mismatched words are misspelled, but all words which fail to match are brought to your attention and can be handled in a variety of ways.

Super Spellguard uses a single dictionary of about 20,000 words drawn from common English usage. You can easily expand this dictionary by adding selected words from any document being proofread during the interactive review of mismatched words. Alternatively, the dictionary can be directly modified outside the proofreading process. By using a comprehensive set of dictionary management functions, you can create an entirely new dictionary from any text file, delete selected words from a dictionary, combine two dictionaries, and subtract one dictionary from another to form a third.

Super Spellguard runs extremely fast. A typical proofreading time for even a fairly long document (say around 15,000 words, or 30 pages) is only about one minute. Of course, you still aren't through until you have settled on a disposition for every mismatched word, and that process can take much longer than the original proofreading time.

Each mismatched word is presented one by one. Unfortunately, just the single word is presented out of context. At your option, you may mark an incorrect word for later correction, add a correct (but unrecognized) word to the dictionary, ignore a word which may be correct but inappropriate for such addition, or return to the previous word for review. *Super Spellguard* does not offer the capability for you to correct mismatched words which are spelled incorrectly. To do this, you must use your own word processor. However, the program will aid in this process by marking every mismatched word you designate with a special symbol of your choosing. (This allows you to use a global search function in your word processor to locate and correct the misspelled words.)

With only a 20,000 word dictionary, *Super Spellguard* tends to flag a lot of fairly common (but unrecognized) words as well as any specialized terms, abbreviations, and so on, which are peculiar to the subject matter of the document. This can be annoying, for it makes the review process lengthy. The gradual addition to the dictionary of other commonly used words, and the creation of specialized dictionaries for each subject area will greatly alleviate this problem. Naturally, it is important that any words you add to the dictionary be spelled correctly.

Super Spellguard provides several other thoughtful features. These include the ability to alter the default selections for certain file names, the marking character, automatic back-up creation, as well as provisions for verifying the program integrity, and entering any small revisions which might be provided in hardcopy from Sorcim. The program comes with an excellent manual of almost 90 pages, handsomely bound. *Super Spellguard* is, in fact, easy to use, and it is reliable and very quick at doing its job—helping you find your own mistakes before they appear in print.

TAPIT: APPLE PERIODICALS

AV Systems, Inc.
$29.95
128K; II+/IIe

Overall Rating	C	C-	*Reliability*
Ease of Use	C+	C	*Error Handling*
Documentation	A	B+	*Value for Money*

TAPIT ("*T*he *A*pple *P*ublished *I*nformation *T*hesaurus") is an interesting program developed to keep track of Apple—or computer—related articles in periodicals. It does this by answering a series of questions about the article and then "packing" the entry to use the smallest amount of space on the disk.

After a short hello, the main menu asks you whether you want to search for a magazine article. You must choose from those already on disk, whether you entered the information yourself or received it on disk.

You can then browse through the articles and edit, analyze, or enter them.

To save disk space, much of the information normally filed in a bibliography must be left off. You can't enter the article name or a text description of its contents. Instead, you place the article under a heading like Business, Database, Interactive Game, and so on, to convey a general idea of the piece's contents. Eventually (or so the documentation states) you should be able to choose specific descriptive words that let you know immediately what an article's main focus is.

I would rather handle fewer articles with more description. I had a hard time following the program's logic, though I appreciate the time put into it. Most of the time, I'm willing to put up with some difficulties if the total output is worthwhile. But after trying to get comfortable with this program, I was still left with an empty feeling.

THINKTANK

$150.00
Living Videotext
64K; Apple II/II+/IIe/III; 16K card (II/II+)

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	B	*Value for Money*

ThinkTank bills itself as "the first idea processor." It will, the manual says, serve as a notebook, address book, appointment calendar, filing system, secretary, administrative assistant, and bulletin board. Well... maybe. Actually, *ThinkTank* combines an electronic outline with a rudimentary word processing program. You might find it useful if you spend a lot of time writing and revising outlines, or if a simple and flexible way of making outlines would help you organize your thoughts. You can also write final drafts within the outline structure, because the program allows you to suppress the outline headlines when you print your text. You can also transfer the outline to your regular word processing program if it can load Pascal files.

ThinkTank allows you to create a traditional outline, with heads, indented subheads, and additional subheads beneath that. You can write one or more paragraphs (up to about a page, double-spaced) under each head or subhead. You can easily rearrange these on the screen; when you move a section of your outline, all subordinate sections move with it. Of course, you could do this much, almost as easily, with the block moves of a good word processing program. The program's best feature allows you to "collapse" any section of your outline, leaving the heads onscreen, either the main heads only or as many subheads as you wish. This gives you an overview of your entire document as you work—particularly useful for longer or complex documents.

The program is quite easy to learn and use. Help menus at the bottom of the screen guide you through nearly all of the sections. Once you have mastered the commands, you can zip through them without referring to the menus.

The manual is generally clear, but a bit muddy on transferring text to a word processing file and some other more sophisticated functions. It's also unnecessarily long and—ironically for a program designed to help you organize your thoughts—very oddly arranged. The tutorial, which logically would come at the front, doesn't turn up until page 43. By this time you've already waded through a redundant "brief tour" of the program. The appendices and glossary come in the middle, followed by a reference section. A more concise manual would significantly reduce the time required to learn the program. The package comes with a copyable program disk plus a data disk with a sample outline (for use with the tutorial).

The print format and editing functions are limited but adequate for producing a rough draft or well-organized set of notes. Because it's written in UCSD Pascal, the program executes commands slowly and constantly refers to disk. Printing is also tediously slow. A hard disk drive would speed things up considerably. The program works best, incidentally, if you put only one outline on each disk (although you can store more).

ThinkTank doesn't adequately substitute for a good word processing program, although many people apparently use it for that purpose. It helps you organize and make lists, schedules, and so forth. It's easy and fun to use. At $150, it's a luxury item. If you make a lot of outlines or need to organize your thoughts more effectively—and can afford it—have a look.

Layout

NEWSROOM

Springboard
$49.95
64K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	B+	A-	*Value for Money*

The Newsroom is a most effective program to teach you about journalism and newspaper production. Novices as well as experienced journalists will find that is has the tools and flexibility to create stylish, sophisticated publications ranging from school newspapers to small company newsletters and business flyers.

Producing a newspaper or newsletter requires a variety of skills. First, the user must organize his thoughts, then translate them into prose. Photos can be created from clip art supplied with the package or from drawings specially make to illustrate the articles. Then the sections are placed on the page, and the presses roll. All that is required is a good quality dot-matrix printer.

The program is entirely menu driven. The cursor can be controlled via keyboard, joystick, Koala Pad, or mouse. The main menu controls the six main functions of the newsroom. There is the Copy Desk for editing material, the Photo Lab for creating photos, the Banner Office for creating the main banner for the paper, the Wire Service to connect two modem-equipped Apples, the Layout department, and the Press Room.

To create the banner, you can choose from different fonts and sizes for the letters and add a picture from the supplied clip art. This is the program's weakest link. The joystick mode is inaccurate, and you lose your position when you lift your stylus off the Koala Pad. It does include a magnify mode to help you fix your mistakes and the Oops icon will erase your last goof.

Once you have your art all you need to do is put it into the banner window. The area outside the window is empty for your type.

You enter your type through the Copy Desk. This is the program's word processor. You type into a window that is half a page wide and about twenty lines of normal type long. You can mix photos with type from this point. The program includes word wrap. I had a lost character problem when I began typing too fast or tried to insert characters into the top of a window that was almost full.

Once you've created all your panels, you go to the Layout Room. Here you choose from between standard and legal size paper, and then go on to assemble your windows into the layout you want. Each page has to be on one disk. It is best to be working on a two drive system or you'll be swapping disks endlessly.

The Print Room is equipped to handle nearly every popular printer and interface card combination. The program defaults to Apple's Imagewriter, but it can easily be changed.

Overall, the program is quite impressive and will enable budding journalists of all ages to produce inexpensive newspapers or flyers. I think that with a little adult supervision even young children will find this program educational. While I wholeheartedly recommend the program to owners of Apple IIe/IIcs, it is painful to use on the old II+s. I wouldn't fault *Newsroom* for this; it just points out dramatically the shortcomings of the older machines.

THE PRINT SHOP

Broderbund Software
$49.95
48K; II+/IIe/IIc; Koala Pad optional

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

An incredibly addicting program, *The Print Shop* prints custom designed greeting cards, letterheads, signs, and banners using the most popular dot matrix printers for the Apple II+, IIe, and IIc computers. You no longer need to hire an expensive graphics artist to custom design your small printing needs, nor need you

fuss with magic markers and a straight edge when attempting to design a sign or banner.

Illustrative pictures highlight every choice in this menu-driven program. You can select items from the menu using keyboard, joystick, or Koala Pad. The program's flexibility allows you lots of choice in your designs. For example, in designing a greeting card you can choose from nine borders, eight type faces (small and large), and sixty graphics pictures and patterns ranging from a birthday cake to a heart, penguin, or abstract patterns. You lay these pictures in geometrical positions depending on size beneath the letters. You arrange smaller pictures in a staggered pattern, and larger pictures in corners or just one to a page. You arrange the message for the front and inside of the card with an editor and choose large or small type, centered, or flush left, or flush right. You have a choice of solid, outline, or three-dimensional lettering. The line-by-line status of each line on the screen editor appears to the left and the right of the editing window; you can change it using four Control keys. Finally, you can center the text on the card, top to bottom, if you wish. When printed, the text automatically overlays the graphics and is highlighted. *The Print Shop* prints the card as it would look prior to folding, with the inside portion correctly placed upside down at the top. You can even add your own one-line logo on the back of the card. Printing proceeds slowly and the computer pauses midway to carry out further calculations.

Letterheads are even easier to create since you need only design the top and bottom of your sheet. Again, you can choose a graphics symbol to highlight the typeface for your company name. The address and phone number appear below. You have the option of putting a horizontal line to separate the name and address from the rest of the page. If you like, you can choose a different graphics symbol at the bottom of your page for artistic effect.

The Print Shop also lets you create 8½ by 11 inch signs. The editor strongly resembles the greeting card editor. You can create banners of unlimited length, up to one page wide (eleven inches). You just type your message and choose a graphics symbol.

The graphics editor primarily allows you to change the graphics symbols, but it also lets you type in messages to superimpose over the Screen Magic image in memory. Since this editor can load standard DOS Hi-Res pictures from another program, you can produce outstanding greeting card designs. This portion of the program also contains two kaleidoscopes. You can sit back and enjoy them, or stop one when you like the image and want to use that screen with the Screen Magic editor.

The Print Shop is extremely user-friendly. It allows you to change your mind at any time during the creative process. You back up through the steps using the Escape key without losing any of your input. However, once you have committed the program to printing your card, you can't change your mind without reentering everything. The program comes with tractor-feed colored stationary; if you need more or want to purchase different colored ribbons, you can do so through the company listed in the instruction manual. In sum, I found this extremely versatile program fun to use, practical, and capable of saving me considerable sums of money in custom printing costs.

PRINT SHOP GRAPHICS LIBRARY

Broderbund
$24.95
128K; IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	B	*Value for Money*

Print Shop Graphics Library, Disk 1 is a two-sided disk containing a collection of 120 new graphics elements that can be used with your *Print Shop* program to produce greeting cards, notes, signs or letterheads. Each graphic was designed by noted computer artists such as Gini Shimabukuro, Gail D. Bales, Lisa Bergquist, Adele Aldridge, Greg Lum, Noreen Strehlow, and Martin Kahn.

There are graphics for holidays and special occasions. You'll find pictures of Santa, Rudolph, a turkey, the Easter bunny and even a dreidel. There are over a dozen adorable animals such as a raccoon, panda, dinosaur, and butterfly. Sports enthusiasts will find graphics for baseball, volleyball, football, tennis and running. Then there are scenes of children learning in the classroom, the twelve signs of the zodiac, a robot, mime, viking, UFO, artist's palette, and much more.

The disk interfaces with the *Print Shop* program. When you reach the Choose A Graphic highlight from the program's main menu, you just follow the prompts and insert this disk. It is as simple as that.

The disk can be booted from either side for a quick demonstration or graphics show. Side one shows a demonstration of nearly half of the graphics elements on the disk. They are loaded by category into four display windows. The second side shows a collection of stills and animation by computer artist Martin Kahn. These images can be loaded into the *Print Shop's*

Screen Magic drawing program and can be printed out to create a fun coloring book for children.

While the 120 graphics elements may not have all the images that you might wish for, it is certainly a step in the right direction especially for the many not-artistic *Print Shop* users. It is a good addition to your library, and there are more volumes coming.

Mailing List Managers

ADDRESS BOOK

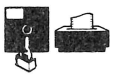
Muse Software
$49.95
48K; Apple II/II+/IIe/IIc/III

Overall Rating	B	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	B	B	*Value for Money*

Since most mailing list programs cost from $19.95 to $39.95, when the *Address Book* arrived from Muse Software with a price of $49.95, I suspected something special. To begin with, a mailing list program should keep an orderly record of your address list with a minimum of effort from you. After all, if the computer can't do it faster and more accurately, why bother? The *Address Book* does handle data efficiently. The program prompts you all the way through data entry. The line where data is requested displays in inverse. You can easily change information before saving the record to disk. The problem with the program is getting there. For instance, the documentation tells you not to use the program disk for data. Since the manual states that you can store up to 700 names at 120 bytes each plus assorted index files at two bytes each, it seems obvious that you cannot use the program disk—you would surely run out of space long before reaching 700.

The program has the advantage of using multiple disks and drives to keep the flow of labels going, although I could not find a way to interlink the numerous disks for sorting purposes. You can define the indexes, but they are limited to two characters. You can also customize label formatting (printing up to six labels across), a flexibility valuable to the many users who want the label-printing capability. The only drawback is the lack of a provision for printing a test label. You must be sure that you have lined up the label perfectly before printing.

One problem came up in defining printer format. Inadequate error checking of incorrect information entries means that if you enter ludicrous information, the program may or may not reject it. When I tried this, the program rejected some entries while in response to others, it returned to the menu. Furthermore, a function is needed that would allow you to print a master list of all entries. This would enable you to verify the accuracy of entered data and to access information in a given file. Unfortunately, the program will not print out a master list. A given record cannot exceed 120 characters, so a master list cannot be printed. Moreover, the program does not track the approach of the maximum 120 characters. Had it been designed to cut off line entries, this would not pose a problem. One last problem: the documentation claims that a Control-Q will allow you to exit the program and return to BASIC. This did not work.



F.C.M. (Filing, Cataloging, and Mailing)

Arrays, Inc./Continental Software
$99.95
48K; II/II+/IIe

Overall Rating	B+	B+	*Reliability*
Ease of Use	A-	B+	*Error Handling*
Documentation	B+	B	*Value for Money*

F.C.M. does everything that a "filing, cataloging, and mailing" program should do, and a good deal more. It is a personal or business mail list/mini-database program. Perhaps the easiest way to describe the program is simply to list a few of its strongest features:

(1) Custom formatting. Unlike a number of mail list programs, this program allows you to create screen formats other than straight mailing lists using as many as 9 lines. This kind of flexibility gives it mini-database capabilities, like an electronic file box. You can also customize labels both for printing labels and envelopes (including a return address feature), and there is a provision in the program that allows you to create a special message on any of the 9 lines when printing in either mode. Because of its format flexibility, *F.C.M.* can handle most

foreign addresses, and up to a 10-digit zip code.

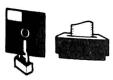
(2) Enhanced printing capabilities. The program prints out full master lists or selected lists of your entries, as well as specially sorted lists for label or envelope printing. In addition to handling special message lines, *F.C.M.* can handle enhanced printer commands, such as a compressed print mode; if your printer has a 14″ carriage, you can print as many as 9 labels across, 9 lines per label. Standard labels will only accept 6-8 lines per label, but this program makes allowances for oversized labels.

(3) Fast search and sort routines. Each diskette stores up to 750 separate entries, and the program allows you to extend your files on multiple diskettes. You enter records at random (i.e., over a long period of time and in any order you want). The program will let you search for entries, edit them, delete them, or sort them according to special needs (such as alphabetical order, company names, memos, or specific zip codes) by any of 12 different categories or combinations of categories. As a nice bonus, the sorting routine itself is extremely fast.

This program also operates with a "Form Letter" module, which provides the facility to use the program with several of the most popular word processing systems for the Apple: for example, *Apple Writer II/IIe, Screenwriter II/IIe, Superscribe, Pie Writer*, and others. "Form Letter" permits you to create letters with your word processor, and then custom address them using the names stored in your *F.C.M.* files.

Documentation for *F.C.M.* is very good; but the program is well organized and completely menu-driven, so much so that you rarely need to consult the manual. For a program this flexible, it is surprisingly simple to operate.

Considering its price, *F.C.M.* offers powerful mailing list features. Yet perhaps its greatest attribute is its flexibility. Because the screen labels can be custom formatted, *F.C.M.* may also function as a mini-database or cataloging system. With it you can create catalogs listing your record collection, coins, stamps, recipes, whatever; or lists for inventory or insurance purposes. All of these lists or parts of them can, of course, be printed out. This versatility makes it considerably more useful than a simple mail list program.



LIST HANDLER

Advanced Logic Systems
$79.95
48K; II/II+/IIe/IIc

Overall Rating	B	B+	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	C	*Value for Money*

List Handler is among the best electronic list handlers presently on the market. It is also among the more expensive ones on the market. There is certainly no disappointment in its capabilities or performance. But because of its high price you will have to judge its value for your individual applications.

This program makes efficient use of disk space (up to 3,000 records per disk). When you consider that the program can direct the activities of as many as eight disk drives, you could theoretically handle a telephone book for a small city (that is, you could link 24,000 records together using eight drives). Each of those records can have up to 255 fields, and each field as many as 200 characters. The longest that any record can be is 4,000 characters. If you need large record sizes, the number of records per disk is reduced proportionally.

One thing is immediately apparent when you boot the program: your Apple produces upper- and lower-case characters, even if you don't have an 80-column card. Moreover, the letter size and spacing is completely proportional (e.g., with "M's" wider than "I's"). *The List Handler* uses an excellent ASCII-type font on the Hi-Res screen to give you more than 70 columns. If your Apple is wired to an ordinary TV monitor you may have trouble reading it. It is otherwise a pleasant set of letters to read, and will work well with a properly adjusted color monitor and flawlessly with a Hi-Res monochrome or Hi-Res RGB monitor.

The publisher had the good sense to realize that most of the people who buy this program are already likely to have a large mailing list or other kind of list on another program. Few people buying list managing programs begin with the prophetic observation that the little list they start today will grow to enormous proportions tomorrow. *The List Handler* can work with existing lists in a DIF formatted file. If, however, you happen to own the companion word processing program *The Word Handler*, you can also convert any text files so that they can be read by *The List Handler*.

One thing you'll notice after you've converted an existing file (list) is that it's not as jam-packed on the new disk as you'd expect. This is because the DIF files leave a lot of blank space. However, *The List Handler* makes up for this with a rapid sort routine. It will sort even a cumbersome DIF file twice as fast as the average database program will. So you have the best of

both worlds: the files don't have to be retyped, and the sort speed is high.

If you do have the foresight to buy a large capacity program like *The List Handler* before you start your mailing list, its speed will impress you. The more information that can be jammed into RAM, the faster it goes. This program does a good job of getting it all in there; and, once in RAM, running it through the selected routines (search, edit, sort, etc.) is fast.

The entire program is menu-driven, but menu-driven with a difference. The initial menu is like any other. It gives you a choice of operations. Once you choose to sort records, for example, the next step is to specify which records and in what order. Not only does *The List Handler* run quickly, it is easy to operate. You are given a page format with four or five commands at the bottom and a clear two-word explanation of each. In the middle of the page you scroll through the sort choices using the arrow keys. Which segment of the list to search is determined by any combination of Equal/Not Equal With character strings and Before/After/Between record designations. The sorts are forward and backward, using alphabetical, numeric, or date sort criteria. Most important, the choices are in simple English, not some sort of logic vocabulary.

The output can either be to labels, or a list, or a columnar report; or you can scroll through the list for non-specific searches. An additional output option is printing form letters created by *The Word Handler*.

Starting a new list is very simple. You merely label the data fields already there, then enter data one screen at a time. There are no field definitions prohibiting alphabetical characters in numeric fields, or vice versa. There's no need to be concerned about predicting the length of a field.

This is a good list handler program, and, in my opinion, worth the asking price. It will let the Apple produce mailing lists, labels, and manage files of huge proportions. It will handle small lists quickly and easily, and give you a great deal of room for growth.

MAGIC MAILER

Artsci, Inc.
$69.95
48K; II/II+/IIe/IIc

Overall Rating	B	B-	*Reliability*
Ease of Use	A-	C-	*Error Handling*
Documentation	C	B	*Value for Money*

Magic Mailer is designed to merge mailing lists with form letters, creating personalized correspondence and other documents. The program is specifically designed to use documents and data files created in *Magic Window* or *Magic Window II*. But it can also handle documents produced by other word processing packages that generate standard Apple II sequential text files and data files from database programs generating Apple DOS 3.3 sequential text files.

The program is operated entirely from one easy-to-learn, easy-to-use master menu, and it offers considerable flexibility in its file-merging techniques. You can load in special print drivers for your printer after you boot the program, and you can also use the menu to specify operatonal features such as multiple disk drives, the interface slot, single sheet feed, and so on. Unfortunately, the program is not as error-proof as it is easy to operate.

Magic Mailer can merge up to twenty data fields in a document. For each field, you have the option of specifying conditional leading and/or trailing text; upper, lower, or mixed cases; and full, right, left, or centered justification. *Magic Mailer* can also automatically sort out from a single combined field the city, state, and zip code as well as the title, first, middle, and last names from a one-line name field. Print options include multiple copy printing; merging of data from your keyboard entries as well as existing data files; on-screen editing and the selection of data records; and sophisticated computer selection specifications. You can, for example, use Boolean logic and string comparisons to have the computer select and print a letter only for those data records representing customers who live in a given zip code area, are listed as having one of several given products, and whose purchase dates and serial numbers fall within specified ranges.

The program's documentation is adequate, but not very well organized and lacks a few important user-friendly touches. You need to wade through complex and confusing explanations of the most sophisticated procedures before you can even work around to the basics of the program. The documentation also lacks an index and a list of error messages to assist you when things go wrong. However, to make up for these deficiencies, the vendor support group is very helpful and efficient.

In general, the program offers good value in a separate mail merging package with sophisticated data treatment and computer selection capabilities. It can most easily be used as a companion to Artsci's "Magic" software series, but it is also adaptable to some other word processing and database programs.

MAILMERGE (MergePrint)

MicroPro International
$99.00
56K (minimum); Apple II/II+/IIe/IIc/III;
Z-80 card; *WordStar* required

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

MailMerge, an overlay program designed for use with the *WordStar* text editor, is a questionable investment if you do not need to merge small files into large documents, either at print time or when sorting items for a text file for printing multiple copies. If you do need to do this, *MailMerge* is an indispensable aid to *WordStar* text manipulation. *MailMerge* includes fourteen commands for handling files. You can use the command repertoire to perform the following: specify the data file for inserts; display the name and order of the data in the file; and perform repetitive reading of a specific file to the end. You can also specify a variable for use in the text, or at print time. During printing, you can have messages displayed or cleared from the screen. You can add files within text (as in adding chapters to a book). You can also specify print-time line formatting to include justification, left and right margins, and line spacing.

The program works well and as advertised—a feat rare in the software market. If you need these capabilities for use with your *WordStar*, the overlay is well worth the price. Please note that Version 3.0 of *WordStar* uses an overlay called Mailmrge.ovr, while older versions use Mergprin.ovr.

MAIL/PHONE LISTING

Compu-tations
$14.95
48K; II+/IIe; DOS 3.3

Overall Rating	B+	A-	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	C+	A	*Value for Money*

This no-frills program maintains up to 200 different names, addresses and phone numbers per file. Menus direct you through all entries, changes, deletions, viewings, and sorts. The program is simple to use and a rare bargain for the price. The disk is unprotected, which means that you can easily modify the Applesoft. You have plenty of storage space on the disk because the program only takes up forty-one sectors.

The program has one obvious shortcoming: the language in which it's written. If you have access to a compiler, you'll find that the program runs much faster if you change the source code into Machine Code. If you have more memory available, you can probably increase the number of records available by changing the dimension in the first line of the program. I was a little surprised that the author didn't make use of various programming utilities to speed up the sorting time or to enhance the appearance of the program, but he probably neglected them to minimize the cost.

I recommend that people who need to maintain relatively small mailing and phone lists seriously consider this program. Its simplicity and low price should not go unnoticed, particularly since it challenges more expensive software so well.

DATA MANAGEMENT

In the broadest and most general sense, a database is simply a collection of information systematically organized for one or more purposes. One common database we all use is a telephone book. It contains names and phone numbers arranged alphabetically to facilitate looking up someone's phone number. Dictionaries, catalogs, and library file cards are also examples of databases we use regularly.

A computerized file management or database program accepts, organizes, stores, and manipulates data in various user-specified ways, and reports the results. The database management program that's right for you should be the one that best suits your needs and handles data closest to the way you'd like it to.

There are obvious and fundamental reasons for organizing data within a business environment. First and foremost is control. Many advantages (increased productivity, for example) result from putting all the information that's crucial to the operation of your business enterprise in one place. Database programs offer you flexibility in maintaining records, plus infinitely greater ease in reorganizing information for a variety of purposes. In fact, many consumers are attracted to database programs precisely becuase of their sophisticated reporting capabilities. The quality of report generating features differs greatly among the various file management and database systems. Nonetheless, this business software helps you reduce costs and improve efficiency.

The exact meaning of "database management" varies according to several criteria: the level of sophistication you're seeking, what kind of database you want to create, and how you want to use the information you store. There are three basic levels of sophistication among current database programs, ranging from the simple to the highly complex. Their functions and prices vary accordingly.

Most file managers or databases consist of files. Each file is made up of different records, and each record is made up of "fields," individual units of related information. In a file (or table), the records are equivalent to rows, and the files to columns. The fields may be classified as alphanumeric, numeric, logical, dollar, date, and so on. Let's say, for instance, that you were creating an address book, a file limited to business clients. Each unit of information—name, street address, city, state, Zip code, telephone number—is a separate field of data. These fields, linking together information on each individual, form one record in the file. Within the database, you could create several files: one for business addresses, one for friends, one for relatives, and so forth.

Some file managers use records, but not fields. These "free-form" file management systems let you enter information into each record in any format you want. Usually they let you specify words or phrases that act as an index for each record. The file manager can sort the records based on the indexed words just like a more stratified database sorts on fields. While you couldn't keep a list of names and addresses in such a disorganized manner, free-form file managers are often just the ticket for organizing writing projects or filing personal notes.

The simplest database is a fast, electronic version of a basic index file card system. If your projects could best be handled with this type of arrangement, then a relatively inexpensive and simple file management program (of limited flexibility) will adequately serve you. At the middle level of price and complexity you'll find programs that offer you a fair amount of power and considerable flexibility, yet are still easy to use. With them, you can format data storage and manipulation in various ways to meet different needs; they should be able to store, sort, edit, retrieve, and calculate data, as well as produce reports in different fashions (various types of graphs, charts, alphanumeric reports, etc.).

The first two levels are basically file managers; file managers can access and manipulate only selected items from a pre-defined file, one file at a time. The most powerful and flexible systems are generally called "relational" databases because with them, you can relate data from two or more files. These packages have the ability to link together elements from a number of different files in

the same database, so they are very powerful in coping with a host of informational needs. No one, however, claims they are easy to use. In some cases, they are virtually programming languages for creating customized databases.

So what should you be looking for in a database? It depends very much on what you want to do, but obvious features include ease of use, ease in designing file formats, reporting capabilities (default and custom), and other user-oriented operating characteristics. You'll simply have to try out a few (or look at demonstration versions) at your local computer emporium.

Another consideration is the reliability and size of the program's data storage capabilities. Does it provide backup procedures? Are there checkpoints for system failures? How many files of a given size can the program handle at one time? Keep in mind that a database program may have an upper limit on both the number of records (rows) and the number of fields (columns) it can handle. If your database table approaches these limits, make sure the program allows "spill over" to more than one disk. There is usually a limit to the maximum number of characters in each type of field. The total number of characters in a record may also be limited.

Flexibility is a vitally important factor when selecting your database software. It is crucial that the program be able to reformat data in various ways—both the ways in which you add or delete information and those by which you obtain printed reports. You'll also want flexible "default options." Programs often come from the publishers with preset data entry formats and other features that appear automatically; that is, "by default." You should be able to change the default values—the standard setup of the program—to meet your individual requirements.

Also be sure to check the program's arithmetic capabilities. For example, along with adding, subtracting, multiplying, and dividing, can your database perform exponential calculations? The ability to edit and sort data also merits your scrutiny. What can you change? What are the decimal specifications and monetary formats available? How is the sequencing of records performed? Can you sort files in ascending and descending order? And when you're sorting, can you use more than one field at a time as search criteria? Can you specify multiple fields, string values, or a range of record numbers when conducting searches? What kinds of data retrieval are supported (*ad hoc* queries, sorts)?

Finally, there are some other features to look for in databases and file managers, depending upon your needs:

- Tutorial
- File expansion (that allows for virtually unlimited file storage capacity and sorting ranges spread out over multiple disks)
- Modification and maintenance capabilities (updating individual records, redefining database tables)
- The ability to match, merge, or simultaneously update two or more files
- Indexing
- Master file extraction for building other files with shared data
- The capacity to interface with other kinds of programs
- Data security (passwords, encryption).

Another salient point: Change is inevitable. The modification of a database structure is usually far more difficult than the updating of individual database records. Capabilities for redefining the database structure vary considerably among the various systems. In the most sophisticated packages, fields can be added or deleted, field lengths changed, and field names redefined by entering a single command. In other packages, by contrast, redefining a database table destroys all of the data in that table. Frequently, however, redefinition can be accomplished through a series of easily mastered, straightforward steps which create a temporary table.

Therefore, unless you know exactly what your database structure should look like, either purchase a package that allows you to redefine the database structure without losing all the existing data, or plan to test the database with a small sample of data, making any changes *before* you courageously embark on your main data entry campaign. Whatever type of database management software you end up choosing, be it high end or low, remember that the accuracy of the output will not exceed the accuracy of the information you input into the program.

—Roberta Ritz

Databases

		Minimum Requirements	Copy-Protected	Tutorial	Grades: Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Number of Records	Characters/Record
Apple/NPL III	**$650.00**	128		●	B	B	B	A	B	B+	32,000	4,000
Apple File III III	**$325.00**	256		●	A-	C	B	A	A	B+	16 MB	2,000
Condor 3 II/IIe/IIc	**$650.00**	64		●	B+	B	B	B	B	B	32,767	1,024
Data Reporter II/II+/IIe/IIc/III in emulation mode	**$179.00**	48		●	A	B	A-	A	A	A-	2,218	250
Databank II+/IIe/IIc	**$110.00**	64		●	B	B+	A-	B	B	B	V	V
DB Master, V.4+ II+/IIe	**$350.00**	64	●	●	B-	B-	A	B	B+	C-	1 Mil.	1,020
dBASE II II/II+/IIe	**$700.00**	64		●	A+	B	C	A	B	A	65,535	1,000
General Manager, V. 1 and 2 II/II+/IIe/IIc	**$229.95** (each)	48	●	●	B+	B	C+	B	A	B+	∞	13,104
Microbase,V.1.0 II/II+/IIe	**$145.00**	64		●	C	B	B+	C	C-	C	4,000	625
Quick File III III	**$100.00**	128		●	A	A	B-	A	A	A	V	1,140

● = performs this function or has this feature

◖ = partially performs this function or has similar feature

Minimum Requirements—The minimum amount of memory required by the program (in kilobytes). Two numbers indicates alternate versions of the same program (see the review for explanation).

Copy Protected—The user cannot copy the disk. Backups may be supplied by the vendor for a fee.

Tutorial—Step-by-step instructions for getting started and using the program, either on disk or in the documentation. Tutorials often use sample text provided on disk.

Number of Records—The greatest number of individual records (self-contained, user-defined groups of information) that the program allows you to keep in one file.

Characters/Record—The maximum length of each record.

Number of Fields—The greatest number of separately defined portions of each record permitted by the program.

Field Length—The maximum length of each separately defined portion of a record.

Disks per File—The largest number of floppy disks that you can use to contain the records of a single file.

Hard Disk—The program's ability to work with a hard disk as the primary storage medium.

Sorting by any Field—You can rearrange a file according to the information contained in any user-defined field.

Sorting Level—The number of levels on which you can simultaneously sort.

Multiple Key Searches—The program is able to locate information for you according to several criteria simultaneously.

Record Number Displayed—The program lets you know where the information with which you are working is located, according to its own bookkeeping.

Sample Data File—The package includes a disk with a sample file stored for your instruction.

Formatting and Use															Document		
Number of Fields	Field Length	Disks per File	Hard Disk	Sorting By Any Field	Sorting Level	Multiple Key Searches	Record Number Displayed	Sample Data File	Print Options	Format of Stored Files	File Accessible	Number of Indexes	Math Capability w/Update	Logic Capability in Update	Index	Glossary	Ref. Card/Keyboard Temp.
30	999	1	●	●	10	●	●	●		AS	●	V			●	●	●
80	255	1	●	●	8	●	●	●	●	Bi	●	10			●	●	●
127	127	V	●	●	32	●	●	●	●	Bi	●	1	●	●	●	●	
35	250	1	●	●	20	●	●	●	●	Bi	●	∞	●		●	●	
100	238	1	●	●	3	●	●	●	●	Pr	●	V	●	●	●		
100	35	100	●		20	●	●	●	●	Pr	●	V	●	●	●	●	
32	254	N/A	●	●	N/A	●	●	●	●	AS	●	1	●	●	●	●	●
1,584	39/79†	117	●	●	15	●		●	●	Bi	●	31	●	●	●		●
50	29	1	●	●	2		●	●	●	As	●	1	●	●	●	●	
15	76	1	●	●	1	●		●	●	Pr	●	0			●	●	●

Abbreviations
AS = ASCII
Bi = Binary
Pr = Proprietary
V = Variable
† = with 80-column card

Print Options—Whether you are given any choice(s) regarding how to print reports of the information you have stored.
Format of Stored Files—The internal representation in memory of your stored information.
File Accessible—Using your stored information in conjunction with other programs (word processing packages or data plotters, for example).
Number of Indexes—The number of diverse ways in which you can simultaneously organize your information.
Math Capability with Update—The program automatically permits you to perform mathematical operations while changing stored information.
Logical Capability in Update—You can automatically make decisions according to true or false values while changing stored information.
Index—An alphabetical list with page references to help you find information in the manual quickly.
Glossary—Definitions of terms found in the manual and specialized microcomputer terms.
Reference Cards/Keyboard Templates—Some form of card, folder, or poster with brief explanations of the program's commands that you can keep by your computer.

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Database and File Management

Databases

APPLE/NPL III

Apple Computer, Inc. (for Desktop Software)
$650.00
128K; III

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B+	*Value for Money*

As you can see, *Apple/NPL III* is *not* cheap, but most database systems cost a lot. *NPL* (Non-Procedural Language) is an information management system that provides you with a method of collecting, classifying, sorting, and organizing your data. It also lets you report on that information or a subset of it. The program accomplishes all this with a small set of simple commands to specify the data used and the appearance of the output. Theoretically, you need never concern yourself with how the computer gets from data to output.

The package includes four disks and three manuals. One of the manuals will look familiar to any Pascal programmer who owns an Apple III: *Apple III Pascal: Introduction, Filer, and Editor*, but a reprinted version for Apple III Pascal version 1.1. This manual comes with the program because *NPL* includes both the Filer and the Editor from Pascal 1.1; you need them both to make full use of the program. A tutorial manual in three parts teaches you how to report on an existing database; how to use a Data-Form screen to enter new data; and how to prepare Data-Form screens, create new data files and master files, and create stored program files for entry and reporting. The User's Manual provides a complete review of the program's features. All three manuals are well-written and clear, with good examples. In fact, the only weak point I found was the System Guide, a pictorial overview of *NPL* and how it resides in the Pascal operating system. Frankly, I kept getting lost trying to find my way around the picture. Nonetheless, I found the written discussion in the manuals clear and succinct.

The files on the disk include utilities to convert standard Pascal text files to *NPL* data files and vice versa. With just a little work, I converted my *QuickFile* files over to *NPL* by writing a *QuickFile* report to disk, using the Pascal Editor to change it from an ASCII file to a text file, going into *NPL* and creating a Master File, and then running the program to convert a text file to an *NPL* data file. Since *NPL* accepts much larger files and more complex reports than does *QuickFile*, this seemed like a good idea. It has proved so.

I had occasion to contact Desktop Software for help with a report I was trying to design. They proved extremely courteous and helpful. When you send in your registration card, the company asks for the serial number that appears on the first screen. You give them the number when you call for help. You are entitled to one hour of free consulting, but the company has not specified the charges after that. When I called, they did not ask me for my serial number.

To decide whether you should invest in *NPL*, you need to weigh a number of factors. For small database requirements, you should probably stick with *QuickFile*. It doesn't cost much and does the job. If you need larger files, you can chose from *NPL*, *AppleFile*, and *KeyStroke*. *AppleFile* requires a hard disk and consumes a lot of space on the disk with your files unless you design your database very carefully, but it costs the least. *KeyStroke* is moderate in price and has many features the other two programs lack, but it also has limitations that they do not. *NPL* costs the most, which may inhibit buyers, but is a known quantity because it already exists in versions that run on machines using UCSD Pascal. The lack of on-line Help screens weakens the program. Because they are so easy to implement on the Apple III, it's clear that Desktop Software made few changes from the UCSD version to create the Apple III version. While this ensures consistent operation, it makes the product appear weaker than its competition when used on a machine as versatile as the III.

NPL is an excellent product with good documentation and excellent customer support, but it costs just a bit too much when compared to its competitors (partly due to bundling the Editor and Filer with the software). Perhaps Desktop and Apple should consider selling a version without the Editor and Filer for those

Apple III owners who already have the Pascal system. They could then charge a lower price.

APPLEFILE III

Apple Computer, Inc.
$325.00
256K; III; hard disk

Overall Rating	A-	A	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	B	B+	*Value for Money*

This program is in many ways the answer to a prayer. With it you can manipulate database files of virtually unlimited size with ease. With almost any software, the more power you build in, the more difficult it becomes to use efficiently. Apple has gone to great lengths to make *AppleFile III* both powerful and simple to use. For the most part, they have been successful.

AppleFile III comes with three manuals and ten disks. Two of the disks make up a completely interactive Product Training Pack that gives you experience with the program, its editing keys and its commands. The first of the three manuals, the AppleFile III Tutorial, provides you with enough information to get started and perform simple database tasks. The program is completely menu-driven, making it easy for you to find your way around. With all this praise, you might wonder why I graded the program as I did on Ease of Use. I confess personal prejudice against still another unique set of commands. For example, almost every other program that I've used requires only one key to delete the last character typed. This one takes two. Moreover, the method of data entry impedes easy use. When you have completed one record, you must Accept it, hit the space bar to continue, then either Undo the whole record or go to the first field and overtype whatever you want to change. There must be an easier way (such as that offered by other programs). Another difficulty arises when you have required fields defined in your record format. If in the process of entering a new record, you notice an error in the previous field, you can't go back and correct it until you enter something in the current field. Why not allow you to move around a record with complete freedom and do the error checking when you want to Accept the record? These annoyances prevented me from giving the program a higher grade on Ease of Use.

Although extremely well-written and well-organized, the documentation lacks some important information. For example, the discussion of data types does not tell you that each takes seventeen places in the output reports regardless of the number of digits you specified to the left or right of the decimal point. You must specify underflow and overflow to display the word "ERROR" rather than scientific notation of the number. Although a minor omission, it is something you want to know. I would also like a slightly fuller discussion of formatting a report. I doubt the typical business user would have either the time or inclination to experiment. An error in the directions for installing the system also detracts from the documentation. Apple provides two startup disks, an original and a backup, but you cannot use either of them in the installation because they are both write-protected. You might become rather peeved at having to go through a second fifteen- to thirty-minute process of getting all the code installed on your *ProFile* after getting an error message to that effect.

As usual, Apple offers good support. When I first got the program installed on my system, I couldn't get anything to print even though the File Manager module said that I had an active printer driver properly installed. I contacted Apple. They asked for the parameters displayed for my PKASO printer driver, and suggested that I change the device type to $41 from $40 so that SOS would recognize it as a printer. Then I could print. Anyone with PKASO printer interfaces should keep this change in mind.

To make maximum use of *AppleFile* you need *ProFile* or some other fixed disk system, but you can get by with a double-sided, double-density floppy drive with at least 560K, because the installed program takes up that much room. The driver file supplied with the program handles a *ProFile* and an Apple serial printer (either the Apple Letter Quality Printer or the ImageWriter) connected to the RS-232 connector. If you already have that configuration, just insert the Installation disk and follow directions (using a copy of one of the Startup disks).

Except for a few annoyances (most listed here), I found *AppleFile III* extremely useful and forgiving. It did what I asked of it quickly and reliably. At $325, I thought it a bargain and I highly recommend it to anyone looking for a database program for their Apple III.

CONDOR 3

Condor Computer Corporation
$650.00
64K; II/IIe/IIc; Z80 card,
language (16K) card, CP/M, 80-column card

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

To operate on an Apple microcomputer, this relational database management system (DBMS) requires a Z80 card, CP/M, a language or 16K card, two disk drives, and an 80-column card. In addition, you need seven blank disks to set up the system. *Condor 3* is clearly not intended for everyone; the manual specifically targets the "intermediate level user." On the positive side, it works with files containing up to 32,767 records, 1,024 bytes per record and 127 fields per record.

Condor 3 comes on three disks identified simply as 1, 2, and 3. It was developed as a CP/M system in 1977 and thus requires a series of configuration steps to function properly on the Apple. These steps include formatting seven blank disks, modifying a CP/M operating system disk including redefining keyboard characters (Control-Q, Control-I, Control-U, and Control-O), adding boot tracks to the formatted disks, and backing up the distribution disks. An exceptional start-up feature offered by Condor Computer Corporation involves the sealed license number included in the system. Until you enter the license number, *Condor 3* is a completely operational system limited only in terms of the number of records it accepts. Unlike most other software, you can evaluate the program on your computer without substantial risk. If unsatisfactory, you simply do not break the seal on the package containing the license number; you can then return the program for a full refund. If satisfactory, you enter the license number and *Condor 3* becomes a fully functioning database management system.

As the manual states, "Condor Series 20 is a database application programming language. . . there are rules that must be followed." These rules may seem overwhelming to someone who has not programmed. Unlike some DBMS packages, *Condor 3* is *not* menu-driven and will appear imposing to many Apple users accustomed to prompts or full menus. Condor uses commands that resemble standard CP/M intrinsic commands:

CP/M	*Condor*
DIR	DIR
ERA	DESTROY
REN	RENAME
TYPE	LIST
CONTROL-C	LOGDISK

In addition, the CP/M command Save has a different meaning than the Condor command Save. The Condor commands more closely resemble standard English, which may help people who have not used CP/M extensively.

File names follow specific conventions. They are limited to eight characters or less in length plus a three character extension, for example: ".DAT" for data file, "DIR" for Directory, etc.

Commands create files with the appropriate extensions. A Condor database or database name is not a file. It consists of a set of files which include a format file (.FRM), a definition file (.DEF), and a data file (.DAT). The data definitions for a data item (i.e., variable) include name and length for screen representation, field type (alphanumeric, alphabetic, numeric, dollar, or Julian date), storage size, minimum and maximum lengths or values plus default value. You develop a database by first creating the screen format and data item names, then creating data item definitions and the data file, and finally adding the database name to the Data Dictionary (DATA.DIC). The last step specifies the .FRM, .DEF, and .DAT files associated with the database. Database names, not files themselves, do not have extensions.

Creating a *Condor 3* database is straightforward. You define a new file name, then create a screen format by placing data item names in brackets on the screen. Enter the appropriate number of underscores with each data item name to represent the maximum field size. You can enter headings and labels anywhere on the screen (without brackets and underscores) and revise the screen until you achieve the desired format. Control-E saves the format by creating FILENAME.-FRM. The program now prompts you to enter the data definitions, allowing you to define and correct data items. Once finished, you confirm the data definitions by typing Y. The system then creates FILENAME.-DAT and FILENAME.DEF as well as entering the database name and files into the Data Dictionary. You can use the Format command to alter the screen format and .FRM file and the Define command to alter the data definitions (.DEF and .DAT files).

As the above sequence indicates, Condor commands either follow prompts or a syntax similar to English. For example, once you have created a database, you enter data by typing Enter Filename (carriage return). The screen input form (FILENAME.FRM) appears and you can enter data. Similarly, the command Print FILENAME.FRM (carriage return) prints the screen format for the file called FILENAME. A one and a half page example in the manual describes step-by-step how to create a database called BIRTHDAY, enter data, sort (Sort BIRTHDAY By Birthdate), display the sorted database (List BIRTHDAY By Name Birth-

date), and print a hard copy report (Print BIRTHDAY By Name Birthdate). *Condor 3* is just that easy to use.

I have already mentioned the Condor commands Dir, Destroy, Rename, List, Logdisk, Save, Define, Enter, and Print. Condor offers many other possible commands within a database:

COMPUTE—Creates computed data item from defined data item(s)
EMPTY—Deletes all data in database
SELECT—Selects all records meeting defined conditions and enters records in RESULT database
STAX—Calculates statistics for specified data items
TITLE—Prints report headings
UPDATE—Changes values in existing records in a database

Each command follows the standard syntax:

COMMAND (Dr.) Database/File (Qualifying Information) [option]

where ( ) indicates optional and / indicates alternate choice. A typical command might look like:

STAX (B:) JOURNAL BY DEBIT, CREDIT [T]

This command, STAX, directs the program to compute statistics on the database JOURNAL located in drive B, on the data items DEBIT and CREDIT. By default the result appears only on the screen. If you add a second option, [P], the output goes to the printer.

Condor 3 allows you to work simultaneously with more than one database. The command Append attaches records of one database to those of another. The command Combine adds the records of two databases into a RESULT database. These commands prove especially useful where multiple units or categories using the same database format ultimately need summarizing. The command Compare matches records of one database file with records of another on specified data items and creates a RESULT database of records where the data items did not match. This function suits many applications, such as the creation of a transaction audit trail. Compare also helps you create a RESULT database for records that did match. The command Post matches records of one database file with those of another on specified data items, updating records in the first file from the records in the second and creating a RESULT database of records that matched. The command Join attaches all fields of one database to all fields of another into a RESULT database. The manual explains these commands, which illustrate the power of *Condor 3*, through the development of a General Ledger Accounting System example.

As a relational DBMS, *Condor 3* does not require the use of specific key fields. However, many of the commands that simultaneously use two databases (Compare, Join, Post) depend upon the existence of matching fields, defined the same in both databases (same name, size, and type).

With the Format command you can create your own Help files, which have the extension .HLP. Typically, Help files record database names and describe procedures and typing commands. You can develop them in a menu format (as outlined in the manual). Combining the Help procedure with another Condor facility that lets you create command procedure files (.CMD) enables you to make your system menu-driven. A command procedure is a set of DBMS commands stored in a file. You can run command procedures directly from user-defined menus via the Help command.

Condor 3 includes various output capabilities, List and Print. The program handles unstructured queries in other ways as well. The command below illustrates one option:

Display EMPLOYEE Whose Dept Is 20 and Review ' 6/1/80

This command displays each record from the database EMPLOYEE that satisfies the qualifying information (Dept = 20, Review ' 6/1/80). If you substituted the Select command for the Display command in the above example, no records would appear on the screen. Instead, the program would create the database RESULT and flash a message on the screen identifying the numbers of records in RESULT (i.e., the numbers of records which satisfied the qualifying information). You can then Save the database or redefine the Select criteria and rerun the function.

A second group of outputs consists of five different report formats: (1) screen; (2) columnar; (3) columnar with statistics; (4) summary; and (5) statistical. The screen format prints records as they appear on the screen. In the more typical columnar format, the columns represent data items and each row represents one record. You have no control over layout, page indicators, spacing, or other variables. The columnar format with statistics is similarly limited but includes summary statistics as you have defined them. The summary format only prints the summary data, not the individual record data. The statistical report prints averages, counts, minimums, maximums, and totals for each specified item. You have little control over the format of the reports.

Report Writer, a component of *Condor 3* not included in either *Condor 1* or *Condor 2*, offers true report formatting capabilities. It attempts to give you complete control over the final format of your reports. You can include any data items, add computed fields, and place text wherever you desire, or complete preprinted forms. You can prepare several reports for a single database or use a specific report for multiple databases. You can also revise reports with respect to the position of data items and text on the page, print

formats, and computational formulas, but you cannot add new lines, text, or data items to an existing report, nor can you correct misspellings. You can send finished reports to either the screen or a printer. To invoke Report Writer, type Report FILENAME (carriage return). The resulting menu offers you four options. The Create procedure is somewhat complex because of the extensive formatting control offered. The Describe procedure outputs the report specifications. Revise and Print perform as expected.

Condor 3 is an extensive, powerful, relational database management system. It requires an unusual amount of extra hardware for the Apple and is intended for an experienced user as opposed to a novice. More complex than most spreadsheets and word processors, it is also very flexible and easy to use once you understand the syntax and commands. The experienced Apple user with a well equipped machine will find it a very good to excellent product.

THE DATA REPORTER

Softwest Programming
$179.00
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

Softwest has replaced the previous file management system, *The Modifiable Database*, with this flexible, three-function package. It includes: a database manager (*The Data Reporter* itself), also capable of producing pre-formatted reports and incorporating primarily the same format as the former system, *TMD*; a text editor capable of producing user-specified, free-form reports ("The Report Generator"); and a graphics formatter ("The Analyzer/Plotter") for producing pie or bar charts plus dot or line graphs using the system's database for statistical functions (i.e., x/y references for min/max, mean, standard deviation, and correlation coefficients).

The file structure is uniquely designed. The logical database (all related records) are written to disk as separate files if the 2,168 byte capacity per logical file is exceeded. The vendor claims this approach allows faster response for viewing, updating, or correcting records; record retrieval is in fact very fast, which can be attributed to minimized disk-access time. Searching and sorting, as long as they are performed within the range of the records residing in memory, will also be optimally faster.

The Data Reporter allows lower- and uppercase input to the system. Although the disk is protected (for a nominal $5.00 remittance, they will send you a backup copy when you mail in your registration card), the programs and files can be transferred to other disks as required. This means, nonetheless, that you will still need the original master to boot the system.

One seeming omission (a carryover from *The Modifiable Database*) is the lack of a report title option in the standard (default) format for report generation. However, I received a cordial and more-than-cooperative response from Softwest when I called to obtain some information on the memory limitation (HIMEM) specifications for programming this feature into the system.

The documentation is thorough and nicely packaged, although a modicum of the inevitable, ubiquitous typos and misspellings are present. Softwest has published an errata correction document, sent out on request.

Some of the system's vital statistics include:

(1) Logical File Size — unlimited.
(2) Protected — partially.
(3) File Organization — random.
(4) Field Size — 50 bytes.
(5) Fields Per Record — 35.
(6) Record Size — 250 bytes.
(7) Record Selection — up to 20 levels.
(8) Report Features — Horizontal columns, auto-formatting, arithmetic cross-footing, subtotals, summary reports, up to three sort fields.
(9) Field/Record Reformatting — with data intact.
(10) Password Protection — with the Corvus' hard disk version (Corvus feature).
(11) Mailing Labels — yes.

There are many other serviceable features included in this package that can be utilized in processing the database functions, the report generator, and the plotter/analyzer in conjunction with each other that make this a very useful and flexible system for personal and small business applications. *The Data Reporter* represents a good investment, with its multi-faceted capabilities.

THE DATABANK

Flowersoft
$110.00
64K; Apple II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	A-	B+	*Value for Money*

The Databank is a fairly standard database program which will probably improve with future updates. The

specific ability to accept *VisiCalc* files without using DIF files is a unique and valuable feature, as is the relative ease of data entry and report setup.

You design a data entry format using the memo option "Create New File." The length of field and name must be designated. Numeric and computed fields are supported; however, dates and phone numbers are not. Data is entered from a separate menu module. Other modules allow finding previously entered records by binary sorting (a moderately quick process); report printing; revising file format; and interfacing with other programs.

While establishing files is relatively simple, recalling them is not. The file name must be typed instead of being menu-driven (though Jim Flowers of Flowersoft says that this will be changed in the update). Another weakness guaranteed to drive you crazy is the way errors are number coded. This requires either memorization on your part or constant reference to the manual for decoding.

The manual itself is adequate and easy to understand, as is the index. The explanations of program use are straightforward and clear. The program itself is not copy-protected (in fact, Flowersoft encourages you to make multiple copies). The limitation of 100 fields is adequate for most applications. Interface with *VisiCalc* and other programs is easily accomplished through the menu options. On the whole, this is a solid, but not outstanding database program.

DB MASTER VERSION FOUR PLUS

Stoneware
$350.00
64K; Apple II+/IIe

Overall Rating	B-	B	*Reliability*
Ease of Use	B-	B+	*Error Handling*
Documentation	A	C-	*Value for Money*

DB Master Version Four Plus improves upon the earlier versions, but any file or utility pack that worked with *Version Three* will also work with *Version Four*. In addition to slightly different display screens, this version has an improved editor, higher capacity, faster performance in most areas, and a much better manual, and incorporates some of the features found in *Utility Pak #1*. The excellent documentation (over 300 pages) includes a beginner's section, a tutorial of the options, a reference guide, and an index and appendix of terms and sample files. The tutorial employs the same example as the on-disk tutorial so that you can key in the same information. If you are already familiar with *DB Master*, you can go right to the reference guide to look up specific program functions.

Contrary to *dBASE II*, *DB Master Version Four Plus* is a full relational, menu-driven database management system and relatively easy to use. You design screens for data entry entirely by the menu, with little flexibility for free form design such as title banners on the data screen. Instead, you select the field type, length, and location on the screen. Although you can have more than one page of data entry, the program unfortunately does not support an 80-column card. This prevents you from laying out a field in 80 columns—a significant weakness for any database management system.

Once you have completed the layout, you select the number of primary fields. The program uses the primary field to quickly access records in your database. With a large database, a primary key search takes only one to two seconds while a non-primary key search takes as long as one to two minutes. *DB Master* restricts you to a total of thirty-five characters for the primary field and will not allow you to designate which fields you want as primary keys. Instead the program takes fields in sequential order. For example, if you had an address file consisting of first and last name, address, city, state, and zip code and wanted zip code as the primary field, you would need to enter the zip code data first. This often results in illogical order of entry of data and a cursor that jumps around the screen as you enter data.

DB Master Version Four Plus formats two disks, a utility disk, and a data storage disk, required for any given data file. Because of this, you really need two drives efficiently utilize the program. Even with two drives, you will do some disk-swapping. You can easily make back-ups because both the utility and data disks are COPYA. Nonetheless, there is still room for improvement in the program. Although data entry and layout are easier to accomplish, output remains awkward and difficult, particularly with the 40-column screen limit. You cannot easily jump to various entries. In addition, if you enter data at the bottom of the screen, you must wait for the program to catch up. I found the arithmetic and editing capability excellent despite some limitations on both entry and output. You can work around most of them, anyway. The excellent selection capability allows for almost instantaneous data retrieval using key fields, only slightly slowed by using secondary keys. Search keys available include wildcard, equalities, and so on. The data retrieval capability ranks among the best. You can change the outstanding default options at any time, or simply use the last screen entered defaults for initial screen layout or data entry.

The reporting capability makes up the one significant weakness of *DB Master Version Four Plus*. Report

layout is difficult to accomplish and very confusing. For one thing, you must use worksheets to lay out the actual print output, yet computers are supposed to minimize the calculations. Moreover, the program lacks some of the simple commands available in other database management systems to center text, left or right justify, and so on. Additionally, the various hierarchical print formats may confuse you, you get little flexibility in specifying page options, and you will need to work with the tutorial and experiment to work out the report options.

On the other hand, the program possesses good expandability, supporting several data disks for a given file. You must use one of the optional utility packs to modify the file, however. Error trapping throughout the program is good, but inserting the wrong disk may cause the program to dump into the monitor or BASIC prompt, forcing you to reboot and start over. Overall, although not as flexible as *dBASE II*, *DB Master Version Four Plus* requires no knowledge of programming and offers a great deal of power. This makes it attractive to beginners or businesses just establishing a database. Again, the complexity of the output and reporting formats and the inflexibility of design layout detract from the program, as does the failure to incorporate common hardware, such as 80-column cards. Although a good database program, *DB Master Version Four Plus* still has room for improvement.

dBASE II

Ashton-Tate
$700.00
64K; II/II+/IIe; Z80 card

Overall Rating	A+	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	A	*Value for Money*

dBASE II is an excellent program. It is called a database program; it probably should be called a database language. The program will not only save and recall data, but will support a large variety of commands that allow you to write programs to manipulate the data. In fact, if you are willing to put up with the slower operation of a general database manipulation program, you need few other programs to run a business. *dBASE II* is a powerful, and consequently expensive, program. Because of this, it may not be a program for the small computer owner who needs a database to keep track of his Christmas mailing list. But if you have a large amount of data which you have to use in different ways, *dBASE II* will serve your needs quite well.

The system will accept 65,535 records per database file with 1,000 characters per record grouped into a maximum of 32 fields. Each field is limited to a maximum of 254 characters. Numbers are carried up to 10-digit accuracy, with the largest and smallest numbers limited to ten to the plus or minus sixty-third power. Character string length, command line length, and report header lengths are limited to 254 characters, with index key length limited to 100 characters. Five maximum expressions may be in a SUM command. If you exceed these specifications, you probably need a larger computer.

dBASE II maintains files differently than many other database programs. Often you will find files stored with comma delimited fields. In this form, only the character string or number that you have placed into the field is stored, and each is divided from the next by a comma. On recall, the program will read the file, counting the records as it goes. When the correct record number is found, it is read and then displayed or operated upon as required. This is an efficient method for storing records since the data is "packed" into the fewest number of characters needed. *dBASE II*, on the other hand, stores its data in an "unpacked" form. Each field is stored as if it were completely full of data. If it is not, spaces are added as needed. This is not efficient for storage space, but turns out to be quite a bit more efficient when the time comes to recover and manipulate the data. Since each field is stored at its maximum length, all *dBASE II* needs to know to quickly find any field in the database is the database structure and the record number. From this, a "pointer" may be calculated which directs the program to the exact start of the field in question. Since the computer knows the start of the file on disk, all the program has to do is move the file pointer to the desired point and start reading data. It's not necessary to read each character and then search for and count delimiters. This results in considerably faster access to data within the database. If the database is quite large, this is a definite advantage. What you trade by using *dBASE II* is disk storage space for running time.

The best way to show the flexibility of the program is to briefly describe the commands available to you. These will be grouped functionally.

Commands that deal with file structure:

CREATE—Defines a new file. The file structure may be defined at the keyboard, may exist as a file created by another program, or may emulate an existing *dBASE II* database.

DISPLAY and LIST STRUCTURE—Shows the structure in use.

MODIFY STRUCTURE—Changes any part of the database structure at the expense of destroying the data in the database. If the modification does not affect field

length within the existing records (like changing the name of a field), you can still save the data in a temporary file and later recover it.

Commands that operate on files:

USE—Defines the appropriate database.

RENAME—Renames an existing database.

DISPLAY—Shows the databases on disk, or all files on the disk.

COPY—Creates a backup copy of any database.

SELECT—A powerful command which allows you to have two databases open at the same time.

QUIT—Closes all open files and drops you back to CP/M.

Commands for organizing databases:

SORT ON—Reorganizes the entire database in the order specified. Only one key is allowed at a time, but consecutive sorts may be performed for multiple keys.

INDEX ON—Sorts the database, but does not actually reorganize it. Instead, an index file is created and used to point to appropriate records when the database is used.

Commands to combine databases:

APPEND FROM—Adds records to the file in use.

UPDATE FROM—May be used to modify data in the current file. Indexed files may be used if both are sorted on the same index key.

JOIN—Creates a third file from two other files.

Commands that allow editing, updating, and changing data:

DISPLAY, LIST, BROWSE—Allows you to examine records in a variety of different screen formats. BROWSE, in particular, gives you the option of full screen editing of up to nineteen records at a time.

DELETE, RECALL—Marks or unmarks records for deletion.

PACK—Physically deletes marked records from a database. COPY and APPEND also have this effect.

INSERT—Inserts a record into the database.

EDIT—Gives you full screen editing of a particular record.

REPLACE—Changes data in selected records throughout the database.

CHANGE...FIELD—Changes data in selected field(s) throughout the database.

@...GET, READ—Displays a variable in a specified screen location, allows you to input and modify it, and then reads it into the database when correct.

Commands for using variables (*dBASE II* allows you to use up to 64 memory variables when writing applications programs. The following commands work with these variables.):

LIST MEMORY, DISPLAY MEMORY—Shows all current variables, their data type (character, numeric, or logical), and contents.

&—Returns the contents of a memory variable as a literal character string that the program may then use in some manner.

STORE...TO—Establishes or changes variables.

RELEASE—Terminates the use of the named variable(s).

SAVE MEMORY TO, RESTORE FROM—Saves current variables to a named file, and then recovers them from that file.

Commands that allow interactive input:

WAIT, WAIT TO—Stops program operation and waits for a single keystroke. The second version places the keystroke character into a memory variable.

INPUT, ACCEPT—Obtains data from you and places it into a memory variable.

Commands that search a database:

SKIP—Moves forward or backward through a database.

GOTO—Moves to a specific record in the database.

FIND—Locates a specified indexed character string.

LOCATE—Searches for a specified string even if not previously indexed.

Commands that output data:

?, DISPLAY, LIST—Used to output expressions, records, variables, and structures.

REPORT—Creates a custom format, and then uses that format to output records. The format is stored for later use.

@...SAY—Formats output to the screen or to a printer.

Commands for programming:

DO—Starts a program or subprogram module.

IF...ELSE...END...IF—When used in a program, performs optional tasks; can also be used for branching to subprograms.

DO...WHILE...ENDDO—Performs the specified tasks until the specified condition is false.

dBASE II operators:

Arithmetic: ( ), /, +, -

Relational: <, >, < >, <=, >=

Logical: ( ), .NOT., .AND., .OR., & ($ is a substring operator to test if one string is contained in another.)

String: (joining),—(joining without blanks)

dBASE II functions:

(record number), * (deleted record), EOF (end of file).

! (convert to uppercase), $ (substring select).

@ (substring search), & (macro substitution), TRIM (trailing blanks).

TYPE, INT, VAL, STR, LEN, CHR—Miscellaneous functions.

This may seem like a quick reference guide to *dBASE II*, but listing the commands available best demonstrates the flexibility built into the program. The language is so complete that the manual has an accounting system presented as an example. The example uses

ten database files and thirty-four command files to drive entry and editing of data.

The one dim point on the *dBASE II* star is its current manual. All the information necessary to use the program is in the manual, but it is sometimes very hard to find in a useful form. At first, you will find yourself flipping between the reference section, the introductory chapters, and, as a last resort, looking for a function in the accounting example to determine its best use. We understand that the manual is being rewritten, however, so this should not be a problem in the future. Additionally, there are several books on the market which describe *dBASE II* and give examples of its use. The program is worth this small inconvenience.

THE GENERAL MANAGER Versions 1.0 and 2.0

Sierra On-Line Systems
$229.95 (each)
48K (64K recommended); II/II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C+	B+	*Value for Money*

The General Manager supports hierarchical database organization. Simply put, this means that you can establish records that depend on other records, which in turn depend on other records, and so on. The structure, if mapped out, would look like the organization chart of a business with one master record (the parent) at the top and branching records (offspring) subordinate to the single master record. An example of such a database structure from academics might consist of basic student information (parent) with billing information and grades (offspring). The billing information might further include overdue notices (second-generation offspring).

This system is very user friendly. If you have a language card or a 16K card, the program will load Applesoft and treat the card's unused memory bank as space available in RAM and use it for the data buffer. The Master Menu lets you change the parameters of the system (number of disk, printer slot, etc), create/edit screens for data entry, initialize data disks, access databases you have created, sort, reorganize the database, print out database statistics, and run special programs you have written. You should read the manual carefully when formatting your system, however, because the program uses disk designations which may not match the way you set up your system. This lets you put the program disk in any drive, but unless you designate it as disk "A" the program won't recognize it. Sierra On-Line Systems tried to make this easier by including screen messages telling you the slot to use, drive number, and disk volume number. The program supports up to four disk drives, but it will operate with a single drive if you swap disks. The manual states that the program also supports Winchester-type drives.

You establish a screen for each level in the hierarchy. One screen per level is expected. Each screen (level) is identified with designated keys for sorting and linking each screen to its origin. If the screen displays information common to the parent or another offspring, the program automatically forwards that information and enters it into the offspring when you enter data. You do not need to enter data into all screens at one time. By using special keys you can locate any parent and offspring, and enter other information as required. At least, so the manual claims. Unfortunately, when I tried this feature following the directions in the manual, a fatal error (Return without GOSUB) occurred. Luckily, the error handling routine trapped the error, and recovery was excellent.

The program supports all of the standard database features for entering and modifying data. You can format fields within each record, and the program also supports special formats for use with such data as phone numbers. As a nicely-implemented additional feature, the program allows computations within and between screens. Also, when searching for a record, you can apply selection criteria which include the standard logical functions as well as range and exclusion.

The General Manager possesses the powerful and handy ability to reorganize the database at any time. You can add, delete, or change the length of fields at will; the program accounts for those changes during the reorganization process. At that time it also realigns the database pointers and records to give better disk access.

In addition to all these benefits, *The General Manager* lets you interface with user-written Applesoft programs to accomplish things that the master program cannot. The manual describes the Applesoft enhancements made by the authors, and describes how to access user programs with the ampersand (&). Some commands that add processing enhancements are: &Open, to open a database; &Info, which yields information about field locations; &Recin, which reads data from a particular screen into a data array; &Find, to locate a particular record using defined selection criteria; &Outfld, which fills in computed output-only fields. The program disk includes a sample invoice program. Appropriate appendices summarize commands.

The program supports multiple disks for a single database. It uses other techniques, such as variable-

length records, to reduce the amount of space required by data on the disks.

The General Manager, Version 2.0 is a substantially upgraded and higher priced rewrite of the earlier version. The s comments on Version 1.0 are still valid except that the bug resulting in fatal error #22 no longer exists. The program, substantially enhanced, performs all standard database management system functions as well as its competitors.

Specifically, the enhancements to Version 2.0 include: compatibility with the Apple IIe, move to Browse/Update mode from Data Entry mode, a print-screen function, global updates and deletions, easily defined blank forms, size limitations of databases, duplicate parameters specifying the placement of duplicate keys, a sort function, unlimited report formatting, inclusion of current date/time in the database records, updating fields in the Browse/Update mode, display of text error message, volume number for database statistics, sending statistics to the printer, new screen positioning commands, changes in named and Function keys, upper- and lowercase alpha characters supported without additional hardware, plus lowercase chip and shift key modifications, and a Backup/Restore utility.

The program comes with two copy-protected Master Program Disks, a Blank Forms/Working Programs Disk, a sample Data Disk, and a manual. The manual consists of eight parts: The Mini Manager, Using the Data Base, Creating the Data Base, Utilities, User Programs, a special Apple IIe user's section, an index, and appendices. The Mini Manager, a well-written tutorial, establishes almost immediate familiarity with the program. You should have little trouble mastering the information on how to use the database, but the section on creating the database proves quite difficult. A tutorial format would help the average user more. The utilities and user program sections are fairly straightforward except that the user program section lies beyond the ability of anyone with less than intermediate Applesoft programming experience. In addition, unless you interface this program to Applesoft programs, you lose much of the system's power and flexibility.

The General Manager more than qualifies if you want a system that stores and retrieves information, generates reports in virtually any desired format, invoices customers, writes checks, balances checkbooks, interfaces with some word processing programs, supports a clock card, and offers flexibility equal to your imagination and ability. If you truly need a sophisticated database management system and have the ability to use it, *The General Manager* ranks among the better available.

MICROBASE Version 1.0

Compumax
$145.00
64K; II/II+/IIe; Z80 card (required), language card, 80-column card (recommended)

Overall Rating	C	C	*Reliability*
Ease of Use	B	C-	*Error Handling*
Documentation	B+	C	*Value for Money*

You can use this database management system for filing, sorting, and record selection; the report mode offers totaling and minor math capabilities. *Microbase* provides a simple but effective data file creation process and report generator. The search and find routines are quite good; they are defined and saved under "Selection Rules" for repeated use. You can combine Selection Rules for more complex data selection if you desire.

The package consists of three disks, two of them copyable using standard CP/M copy routines, and the third partially copy-protected even though Compumax recommends using the CP/M "PIP" command to transfer files to a Demonstration Disk. You use this disk to change program modes and to save wear and tear on your Master Disk. If you use the demo disk for actual data entry, it will accept only twenty records per file. I found this quite annoying. You need six disks present while working with the program: the three program disks, the demo disk, a data disk, and a backup data disk (whose importance I can't overemphasize). An erroneous disk swap causes the program to crash and you lose all data in the file. In fact, if you frequently change program modes, you'll find the disk swapping quite tiresome. For example, assume you have created a data file and want to add one record, change one record, delete one record, and print a report with the updates. This process requires eight disk changes in a two-drive system—excluding the backup operation I recommend.

Microbase defines five field types: Alphanumeric, Numeric, Date, Telephone with area code option, and Social Security Number. It limits the lengths of the first two fields to twenty-nine characters, and the last three to standard default lengths. Record length cannot exceed 625 characters in no more than fifty fields. Although according to the manual *Microbase* handles up to 4,000 records per file, the standard Apple floppy (126K of memory) holds approximately 400 records of up to 125 characters. The program is compatible with hard disk drives.

Microbase lacks global update, edit, and delete capabilities, forcing you to change or delete records individually. If you want to use the same format in another file, you must copy the file and delete each

record one at a time, or create a new format from scratch. The limit of one key field also becomes cumbersome. The key field must be unique, which is great if you have a field that meets this condition, but if not you must create another field to serve as the key and enter this superfluous data for each record. The program has no auto counter or auto increment feature to assist you. You can change the key field any time, even if you already have records in the data file. However, you must exercise care to eliminate all duplicate entries in the field you want to select as the new key. If you duplicate entries, the program will retrieve only the first one in the file.

The well written instruction manual contains figures of each program menu and explains menu options in sufficient detail for a novice to get the program up and running in a very short time. Onscreen Help messages are available almost anywhere in the program. Since the Master Disk is copy-protected, Compumax provides a new Master in exchange for your original disk and $30 after you register your program.

Although *Microbase* has many shortcomings when compared to more powerful database systems, it does have its place. Aside from the disk swapping and potential crashes, I found it easy to use. Moreover, it allows you to set up custom report or label formats in a matter of minutes, with column totals and mathematical formulas assigned to the columns.

QUICK FILE III

Apple Computer, Inc.
$100.00
128K; III

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	A	*Value for Money*

Quick File III (Version 1.1) comes with *VisiCalc III* and *AppleWriter III* in the Professional Solution Pack that Apple Computer often markets with the Apple III. In my opinion, of the three programs *Quick File III* best does what it sets out to do. It is a memory-bound information management system in that the computer's RAM memory limits the size of a file. Version 1.1, which became available in December of 1982, improved upon the original version in both speed and capacity. It also added a new report option and two new record selection options.

Apple calls the program efficient, versatile, and easy to use with small to medium-sized collections of information. Since all data resides in memory, the program runs as fast as the 6502 memory allows, which certainly makes it efficient. You can send reports to the screen, a printer, or a disk file in any format you choose, ordered on any field or group of fields. The program calculates totals and subtotals if you desire, plus calculates columns based upon formulas you enter. The calculated column concept works fine, but it introduces the program's only weakness—the lack of operator precedence rules or parentheses. It employs strict left to right evaluation.

Quick File is easy to use, with menus in simple English and on-line Help screens. The displays are well laid out. In addition, you can modify the standard record layout, each field receiving an equal share of the display. The program does impose some limits: a maximum of twenty-six files per floppy disk (or subdirectory on a *ProFile*); fifteen categories per file; seventy-six characters per category; 1,140 characters per record; twenty characters in a file name; and twenty characters in a category name.

The well-written documentation provides excellent examples, good organization, and clear explanations. It even includes a tear-out Reference Card. Unfortunately, this is the same manual that went out with Version 1.0, with no update telling of the new features and changes in the program.

Quick File III lets you do so many things that I have covered only a portion of them here, but I think you will find that it can handle all of your small database chores. I use it to keep track of my record collection, video tapes, books, expenses, and even my floppy disks.

SUPERSORT

MicroPro International
$250.00
64K; Apple II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Supersort, an extremely flexible tool for data file manipulation, covers a wide range of applications. Sorting, merging, and record selection functions are carried out on files compatible with a wide variety of languages operating under CP/M or similar systems.

The program is configured to sort up to thirty-two input files and merge them into a single output file as required. If you have thirty-two pre-sorted files for merging, they will read as input within system limitations or constraints (memory is the main limitation).

Sorting and merging of input files is specified in the same run for greater efficiency. Record selections, file conversions, and other features of the program can be used independently of the sorting and merging process.

Supersort input files may contain ASCII, BCD, and/or binary data with logical record lengths up to 4,096 characters. The records may be (1) fixed length, (2) variable length with a carriage return as the delimiter or with the length specified at the beginning, or (3) COBOL relative files. Fields used as sort keys for testing record selection may have either a fixed column position and length or a variable comma-delimited position and length. This allows for maximum program flexibility.

Supersort allows up to thirty-two key fields; you may specify each as ascending or descending sequence with different data attributes. You may further designate the key fields as ASCII, BCD, or binary formats. A nice feature is the use of numeric ASCII option sorts on all free format numbers, including exponential notation. For those using FORTRAN or BASIC to create files that require sorting, this means that the program supports most print formats.

Binary data types include fixed-point for any length, signed or unsigned, stored as low-high or high-low. Additionally, MicroSoft floating-point (single- or double-precision) is supported. These include the integer plus single- and double-precision real-data types conforming to MicroSoft MBASIC and FORTRAN specifications. Some of the specific options are EBCDIC characters, processing lowercase as uppercase, treating the last rather than the first character of a key as most significant, and ignoring the high order (parity) bit.

Record selection is extremely flexible and powerful. Records may be selected or excluded. Any number of conditional tests may be made on any field against a specified value, a range of values, or against another field in the same record. Values for the test may be specified as text strings, BCD numbers, or binary values in octal, decimal, or hexidecimal.

All of the usual test operators such as less than, equal to, greater than, and so on, are supported. In addition, there are two other operators: between and not between, which serve as range testing for values. These tests may also be combined with And, Or, and Exclusive Or operators.

Some added features can be useful. The beginning and ending record numbers for each sort input file may be specified for selective processing. You also may change the output disk for added processing capability with smaller computer systems. Another option that helps reduce disk use is a tagging option in which only pointers to records are used during sorting and merging. The records are then retrieved via a high speed random access algorithm for writing to the ouput file. Printouts at the console can be a simple "it's done" type message, to a full explanation of what was done, including disk space usage.

With the record selection capabilities of *Supersort* you may also perform file conversion functions; for example, converting fixed-length records to records with comma delimiters. Fields within the records may also be rearranged with simultaneous sorting if needed.

A particularly useful feature of the program is the ability to create a key index file with the aid of *DataStar*. With this feature you may use *WordStar* to globally change some feature of the database and then use *Supersort* to recreate the index file. This is helpful when you change the input form with the *DataStar* program. Record numbers are also available for creating multiple keys. In addition, the sector number and byte offset at which each record begins are available as yet another method of creating an index.

The program operates by either interactive keyboard command mode, or by use of a command file for often-used sequences of operations. In addition, *Supersort* has relocatable object code for use as a subroutine in FORTRAN, COBOL, or assembled programs. The relocatable code may be modified to delete unneeded features, helpful in memory-limited systems.

Supersort uses a heapsort algorithm with modifications to adjust internal memory allocation, input/output buffer sizes, and other variables in response to the job at hand. With large amounts of RAM there will be less disk activity.

File Managers

		Minimum Requirements	Copy-Protected	Tutorial	Grades: Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Number of Records	Characters/Record
Bank Street Filer II/II+/IIe/IIc	**$69.95**	128	●	●	B	B	B+	A	A-	B-	512	50,000
Data Perfect II/II+/IIe/IIc	**$129.95**	48			B	C	C	A	B	A	V	511
Datafax II/II+/IIe/IIc/III	**$199.00/$249.00***	64		●	A	A	B	A	A	A	1 MB	960/ 1,920†
Instant Recall II+/IIe	**$59.95**	48	●	●	A	A	A	A	A	A	N/A	N/A
Mastertype's Filer II/II+/IIe/IIc	**$49.95**	64	●		B	B+	B	A	B+	B	250	10
QBASE II/II+/IIe/IIc	**$189.00**	64	●	●	C+	B+	B	A	A	C-	∞	4,000
Quick File IIe IIe/IIc	**$100.00**	64	●	●	A	B	A	A	A	A	250/ 700‡	1,140
Speedfile II/II+/IIe/IIc	**$59.95**	48	●	●	B	A	A	A	A	B	V	1,600
VisiFile II/II+/IIe	**$129.00**	64	●		B-	B	B+	A	A	B-	15,000	232

● = performs this function or has this feature

◖ = partially performs this function or has similar feature

Minimum Requirements—The minimum amount of memory required by the program (in kilobytes). Two numbers indicates alternate versions of the same program (see the review for explanation).

Copy Protected—The user cannot copy the disk. Backups may be supplied by the vendor for a fee.

Tutorial—Step-by-step instructions for getting started and using the program, either on disk or in the documentation. Tutorials often use sample text provided on disk.

Number of Records—The greatest number of individual records (self-contained, user-defined groups of information) that the program allows you to keep in one file.

Characters/Record—The maximum length of each record.

Number of Fields—The greatest number of separately defined portions of each record permitted by the program.

Field Length—The maximum length of each separately defined portion of a record.

Hard Disk—The program's ability to work with a hard disk as the primary storage medium.

Sorting by any Field—You can rearrange a file according to the information contained in any user-defined field.

Sorting Level—The number of levels on which you can simultaneously sort.

Multiple Key Searches—The program is able to locate information for you according to several criteria simultaneously.

Sample Data File—The package includes a disk with a sample file stored for your instruction.

File Accessible—Using your stored information in conjunction with other programs (word processing packages or data plotters, for example).

Number of Indexes—The number of diverse ways in which you can simultaneously organize your information.

Formatting and Use												Document		
Number of Fields	Field Length	Disks per File	Hard Disk	Sorting By Any Field	Sorting Level	Multiple Key Searches	Sample Data File	File Accessible	Number of Indexes	Math Capability w/Update	Logic Capability in Update	Index	Glossary	Ref. Card/Keyboard Temp.
50	40-col. 80-col.				1	●	●	●	1	●	●	●	●	
32	127			●	9	●	●	●	∞	●	●	●		●
N/A	N/A		●	●	∞	●	●	●	32,767			●		●
N/A	N/A				N/A	●	●		0			●	●	●
10	24			●	1		●		1		●	●		
50	78				3	●	●	●	1	●		●	●	●
15	76				36		●		0	●		●		●
N/A	1,600				3	●	●		∞			●	●	
24	128				1	●	●	●	∞	●		●		●

Math Capability with Update—The program automatically permits you to perform mathematical operations while changing stored information.

Logical Capability in Update—You can automatically make decisions according to true or false values while changing stored information.

Index—An alphabetical list with page references to help you find information in the manual quickly.

Glossary—Definitions of terms found in the manual and specialized microcomputer terms.

Reference Cards/Keyboard Templates—Some form of card, folder, or poster with brief explanations of the program's commands that you can keep by your computer.

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Abbreviations

V = Variable

† = with 80-column card

* = Extra cost for 80-column version

‡ = With 64K expansion

File Managers

BANK STREET FILER

Broderbund
$69.95
128K; IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	B+	B-	*Value for Money*

Bank Street Filer is a small database or information organizer primarily for home use. The program, which was developed at the Bank Street College of Education, touts itself as menu driven and easy to use. Actually, it's about on par with *Mastertype's Filer*, with a few additional features. It is much more flexible in both its database format and in the power of its search, sort, and print functions. On the other hand, novices will find the program more difficult to learn. And, as is customary with these simple database managers, the number of records or fields allowed in any one file can become a problem. Since this program chooses to keep the entire database in memory, you are limited to between 32,000 and 50,000 characters. That might be enough for 500 three-line address labels.

It's important to be able to customize your database. Labels and their corresponding fields can be placed anywhere on the forty- or eighty-column screen (because there are two versions of the program on the disk). Data format categories include alphanumeric, numeric, money, date, Zip, phone, time or computed. There are many categories because the information self-formats after entry. If you enter the date as 71185, it will reformat to 7/11/85. Other programs usually handle this by putting in the slash marks and automatically advancing the cursor past them. You can even add a seven-line comment at the bottom of any record. Of course, this will reduce the number of possible records, but this program only keeps track of the amount of memory left. And if this comment field becomes important, you can rename it to a real field.

This is one of the few file management programs that can add, delete, or change data fields after records have been entered. Most programs don't like to do this—they either lose data by re-defining the type of field, or all of the records on the disk have to be extensively reformatted. It is a much less formidable task if the entire database is kept in memory like in this program.

Searching through your records with the find function is quite powerful, although somewhat awkward. You construct a selection sentence by choosing menu items from a series of overlapping windows. It is a combination of selecting fields by comparing them with a few typed words. For example, you could find every record where the "Season Games" field is greater than eleven and the "Batting Average" field is greater than 275. If you need to go through these menus to find every record with a position field of "Catcher," you'll wish you could type "catcher" at the position field and find your record(s). Sorting is fast, but you have to construct a sort sentence rather than just pointing to the field and requesting an order.

The printed report structure is quite flexible. Reports can be printed with tables with the fields listed across the top of the page, as customized reports, (similar to data entry format), or in text format. The latter, similar to a form letter, is in paragraph form with text that you supply between the fields. You can save your formats to disk or use any of the program's quick report formats. It is possible to get 128 characters across the page, but you'll have to manually set your printer for condensed mode first.

Bank Street Filer is a fairly powerful program. It is definitely an intermediate level database for small lists. It has the power and flexibility of more powerful programs but lacks their capacity.

BOOKENDS

Sensible Software, Inc.
$124.95
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	B+	B+	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	B-	*Value for Money*

Have you an extensive collection of written material you would like to catalog? Are you a researcher/writer making extensive bibliographic references and annotations? If so—and you are willing to make the effort it takes to construct an electronic database—this program could prove most useful.

Bookends collects its information through a series of fill-in fields: Titles, Journals, Volume, Pages, Date, Publisher, Keyword(s), Abstract, and Classification. Each of the fields accepts 255 characters, except Abstract, which allows 720 characters, and Classification, which accepts one character. There are practically no restrictions on the form of the entry, and you may skip inapplicable fields. The information is placed in a self-named file in records much like a stack of electronic library index cards. One problem: the program supports upper/lowercase input and output, so if you don't have a shift key modification, a substitute must be used to signal if you wish upper- or lowercase. In this instance, it is Control-S, a two-key operation which can slow up entry considerably.

To achieve its rapid searching ability, *Bookends* unloads an entire file called up from the disk into memory, which means file size is linked to memory size, 85 to 170 references in 48K, and 120 to 240 references in 64K. Of course, any number of files can be kept on disks. References can be alphabetized by author, keyword, or title, and can be selected by number, author, date, keyword, or title. There is a limited Boolean And/Or search facility. It is also possible to list all the authors or key words in a file.

The real magic of the program lies in its ability to output the references (to screen or printer) in a virtually unlimited assortment of self-designed formats. You can even mix formats in a single listing, and the listing can be appended, bibliography-form, to a text file prepared on your word processor. How far you can carry this will depend on your skills as a librarian, your ingenuity in using *Bookends* programming directions, and your understanding of the codes that make your printer work.

I hate to criticize documentation that includes a built-in Help file and a tutorial, and which contains a table of contents and an index, but the net result is almost as confusing as it is helpful. The electronic Help file simply duplicates material found in the program's handbook. The tutorial exercises do not move you through the program's features without considerable back and forth referencing. The disk space utilized for the former could have been better used to enhance the latter.

DATA PERFECT

LJK Enterprises, Inc.
$129.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	A	*Value for Money*

Data Perfect provides excellent value in an economically priced file management program with considerable flexibility and sophisticated features. It offers a variety of input and output formats, well-integrated backup procedures, mathematical functions, sorting, merging, and format modification capabilities. However, it lacks ease of use. Modifying input and output formats is frequently awkward and time-consuming, requiring repetitive cycles through program modules to execute simple changes and procedures. Further, the command vocabulary is often confusing. Finally, like many purveyors of microcomputer software, LJK refers to its file management program as a "database" program. This usage is common in the micro industry, but buyers should realize that microcomputer data bases cannot mirror the power and complexity of data bases on minis and mainframes. Only a few, like *Condor 3* and *dBASE II* employ methods of organization more sophisticated than the straightforward file.

Only one disk drive is required, but for easy backup, sorting, reformatting, and merging you need two drives to avoid constant disk swapping. The program can take advantage of the standard lowercase character generators for upper/lowercase data input, and the popular 80-column boards for screen formatting, but it also works very satisfactorily with the Apple's unenhanced uppercase and 40-column screen width. You can even format 80-column or wider reports with ease, using only the 40-column screen.

The program is capable of merging into a file (or "database" as *Data Perfect* understands the term) any DOS 3.3 compatible random access or sequential text file, and interfaces with LJK's *Letter Perfect* word processing program for form letter production and text editing of records.

Each database is created on a separate disk, and can have up to 32 fields per record, with a maximum field length of 127 charactrs and record length of 511 charac-

ters. Field types include alphanumeric, date, numeric, or formula. Up to sixteen formulas per record are permitted, and can include a number of special mathematical functions. The maximum number of records is limited to a single disk and determined by the length of each record. The procedure for backing up a format is automatic in two-drive systems.

One continuous, easy procedure creates a file, or database, by assigning the screen position of each field, the field name, and field data type definition. You are well advised to follow the manual's suggestion to plot out in advance the screen format on graph paper, because post-creation modifications are awkward. To move or modify a field requires (Q)uitting add mode, (K)illing the field, (R)eturning to add mode, and re-entering the field. There is no simple procedure for moving or modifying an existing field. It is easy for the new user to get lost somewhere along the way in this sequence, but repeated use makes it easier, if not much less time-consuming. After establishing all the fields with their definitions, you can set defaults for any desired fields, and are then given a full statistics record for the file to review before final saving.

Data entry is flexible and easy. A number of time saving commands and control character sequences provide for efficient editing procedures and easy movement around the screen. Global updating is also available, and can be used to mark records selectively for use in form letters.

Record searches for viewing, editing, or inclusion in reports can include criteria from up to four different fields, with two criteria per field. Record number and record number range searches can also be combined with field criteria. Single character (?) and unlimited character (s) (*) wildcard capabilities are available for character string searches, so you can specify both complete and partial field contents. Searches can also specify a full range of mathematical relations and "include" for each search field. Multiple-criteria searches permit you to specify that either all criteria must be met, or that a match on any one will suffice. While all these options are easy to use, this Boolean capability provides an example of the sometimes confusing command vocabulary. To set up the Boolean relationship, you respond to a verify prompt with a YES for "all" (or Boolean AND), or NO for "any" (or Boolean OR). The YES or NO are, in fact, in response to the "AND TYPE SEARCH?" query at the bottom of the screen, but these queries are awkwardly placed and often missed. For safety, you constantly need to refer to the manual for proper interpretations of unfamiliar procedures.

The manual accompanying *Data Perfect* is adequate as a reference guide, but lacks a tutorial leading you in proper sequence through the necessary procedures to begin using the program. Loading a database, for instance, comes before creating one. While this order corresponds to the menu sequence, it doesn't make much sense to the beginning user, who may be confused to learn about file loading before he has created a file. The omission of error correction procedures from the Create chapter can also leave the new user stranded if he makes a mistake. (If you find yourself in this position, check under "Reformat a Database" in the Utilities chapter.) The review copy of the manual was a preliminary one, so we hope that these problems, along with the typographical errors, will be corrected in general release versions.

Data Perfect offers a number of useful housekeeping functions as part of its Utilities menu. This menu backs up data from one disk to another (data is backed up separately from database formats), packs a file and deletes unnecessary records for space conservation, and displays a database format and checks formulas or field lengths without reloading the database.

The Utilities menu also offers more sophisticated features to sort, reformat, and merge files. Files can be sorted in ascending or descending order on up to four fields with a maximum of 255 characters. You can also limit the number of characters on which to sort in any field. The reformatting feature permits you to add, delete, or change fields in a file, and with the merge capability, you can do so without loss of data. The merge option can also transfer data from any *Data Perfect* file into another, or convert any *Letter Perfect* or other DOS 3.3 random access or sequential file into a *Data Perfect* database.

Data Perfect's flexible report generation capabilities include both columnar reports and a labels option. The columnar report format permits up to seven header lines, and two detail or data lines for each record. Page widths can take advantage of wide printers with up to 127 columns. Boldfacing capabilities are also supported. You can use existing formulas or create new ones for each report, total any number of fields, and specify up to four subtotal level breaks. Full editing capabilities for modifying reports are included. The labels option allows you to format labels with up to nine data lines. Although no page-top heading is permitted, you could also use this option to create reports requiring more than two data lines. In both columnar reports and labels, field names and literals can be incorporated into the data lines. Full search criteria can be used for selective record printing of both reports and labels.

In short, *Data Perfect* is a versatile and sophisticated file handler with excellent organizational and report-generating abilities. It is useful in business and would be especially valuable to a user intending to produce printed, formatted files. Combined with *Letter Perfect*, it makes an attractively priced package. Some

problems with documentation and with awkward procedures can be easily solved, but a prospective user should realize that a certain amount of familiarity with the programs is necessary to fully utilize the program's potential.

DATABASE JR.

Intellectual Software
$49.95
48K; II/II+/IIe/IIc

Overall Rating	D-	B	*Reliability*
Ease of Use	C	C-	*Error Handling*
Documentation	D	D	*Value for Money*

Database Jr., allows children in grades four through eight to design and enter their own databases. The program disk also includes a program for entering graphs called Make-A-Graph.

Database Jr. can hold up to 100 items (records) with up to twenty categories (fields) on each database. There is no provision for storing databases anywhere but on the program disk. Generally, the record names used can be up to 256 characters long if commas are not included. If you enter figures spaced with commas during searches, all numbers past the comma are cut off. Printouts of successful searches can be obtained.

The accompanying program, Make-a-Graph, constructs bar graphs from data provided by the user. After entering the name of the graph and the data, a bar graph consisting of a line of asterisks shows on the screen. However, switching from *Database Jr.* to Make-a-Graph can only be done by rebooting, which effectively loses any database from *Database Jr.* There is no way to load a database from *Database Jr.* to Make-a-Graph, even though the manual indicates this is possible.

This program has many attributes in common with other inexpensive databases. It is easy to design a database and make searches by key entries. In addition to single key word searches, you can also do double word searches, sorting, and counting of data items. However, only one search can be done at a time; then you must go through the menu again. The program loads *very slowly*. If you mistype the name of the database to be loaded, the program crashes and you exit to the system.

There are apparently several versions of this program, and it is hard to tell which is which. The original review copy would not interface with my Okidata printer, so the vendor sent a newer copy. This one worked, but didn't include the delete, double name search, and sort utilities, which are mentioned in the manual they sent later.

The best I can say about this program is that Intellectual Software offers great support. They have an 800 help number on the disk and they're very cooperative. The program is OK for teaching beginning database concepts, even though the terminology is not consistent with general usage. For example, it takes a while to get used to the words "item" and "category." Once the basic database concepts are learned, *Database Jr.* becomes tiresome and one feels its limits.

DATAFAX

All Easy Corporation
$199.99 (40-col.)/$249.00 (80-col.)
64K; Apple II/II+/IIe/IIc/III

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

Datafax is a database management program that operates in a similar manner to *VisiDex*. Data entry is free-form on a screen or a series of screens. Recovery is through the use of keyword searches. This is a very flexible system for data entry and recovery, but is quite limited if you need to format different reports from your data.

While the program is written and runs under Pascal, you do not need the Pascal operating system. All of the files required to run *Datafax* are on the distribution disk. However, you do need to have a 64K configured Apple. Because the system runs under Pascal, your hardware configuration is important. The manual clearly spells out these requirements.

The data is organized in sets composed of folders, with folders made up of screens. Throughout, key words tie the database together. Words, combinations of words (up to 28 characters), or dates may be specified as key words; and the program keeps track of everything in alphabetical order (dates come first). You may search for key words singly or in combination.

When entering data, *Datafax* uses a simple but effective screen editor. Commands allow you to move around the screen and insert/delete text or lines as required. Screens may also be moved, added, deleted, or copied. There is also a tab function.

All phases of operation are controlled by single or double keystroke commands. For the most part, any of these commands may be changed under user control to make a set more in line with a particular user's desires.

Data storage capability is limited by the mass storage available. Number and length of key words directly affects the number and length of folders which can be stored. The message is that key words should be short to be effective: this also speeds up execution. Keyword search also allows a wildcard character "✱".

Folders found by a search may be printed to a disk or printer. Printing keys are optional. If the keys are not printed, you may accelerate the number of lines that may be printed. From this, you may create a mailing list by putting the address in the top three or four lines of a screen with supplementary data following. To create the list, print only the top lines on all appropriate entries.

An autokey feature assists keyboard entry. With this, the same keys may be assigned automatically to one or to many screens or folders. An additional entry feature allows you to create standard Pascal text files with the Pascal editor and then read these files into *Datafax*. Only a few rather simple instructions must be followed to accomplish this. The *Datafax* files may be similarly downloaded into Pascal text files.

Datafax is extremely easy to use and, as a manager of a simple database which does not require formatted reporting, it is quite useful. Recommended.

THE HOME CATALOGER

Arrays, Inc./Continental Software
$59.95
48K (II/II+); 128K (IIe/IIc)

Overall Rating	A-	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	B	*Value for Money*

People often own far more than they realize, or need to keep track of dates or lists for important events. They can either organize it with many pieces of paper in card files, or do it efficiently and flexibly with their home computer. *The Home Cataloger* from Arrays, Inc./Continental Software is an easy and powerful way to keep track of any information you'd normally store on a card file.

You can create computerized filing systems, or use the program's ten pre-designed cataloging formats. The ready-to-use formats include telephone lists, inventory, travel planner, restaurants, insurance policies, coins, growth (height and weight), jogging, studies, and book lists. All you need to do is plug in the specific information.

An advantage *The Home Cataloger* has over card files is the ability to quickly total numbers in any or all numeric categories. This is excellent for determining the values of your collections or possessions, for instance.

The Home Cataloger provides quick and easy access to records and lists that would otherwise require going through scattered pieces of paper. It can act as a social calendar keeping track of important dates such as anniversaries, appointments, and birthdays; you can use it as an address book; it can keep track of records such as medical records and insurance policies; it can be an inventory tool; and it can help you make out lists of guests for parties and weddings.

You can print out any information from your lists, either entirely or by selected categories. For instance, you can print out the appointments for the coming week, or run out a list of your valuables for insurance purposes.

The Home Cataloger is easy to use, and comes with a simple instruction guide. Depending on your hardware, it can allow up to 1,500 individual entries and store up to five collections or lists per disk.

INSTANT RECALL

Howard W. Sams & Co.
$59.95
48K; II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

This unique database manager will appeal to anyone who needs to store and retrieve loosely related or unrelated information. The method of data entry sets this program apart from traditional database management programs: you enter information in any format, without regard to structure or fields. Blank screens replace fields, holding up to twenty-one 40-column lines of text. You need not format any two screens the same way. The program stores and processes data in units called files, each containing up to 28,000 characters. One disk stores up to four files. The program can load a full file in less than five seconds and provides almost instant access to nearly one-quarter of a million characters of data if you use two disk drives.

Instant Recall has three modes: Command, Text Entry, and Search. Command consists of utilities and housekeeping functions, such as appending files and initializing or duplicating data disks. Text Entry puts a very complete and powerful text editor at your disposal, with sophisticated features such as word wrapping, and entering or editing information in the database. Search locates any word or part of a word with astonishing speed. The program considers all words in the

file key words. For example, requesting a search on the word "graph" calls up screens containing "graphics," "geography," or "graph." Unfortunately, the flexibility inherent in both formatting and search functions has a price: *Instant Recall* does not sort and will not produce reports based upon selective searches. You obtain hard copy from files by pressing Control-P to dump screens to a printer.

Instant Recall comes with a master disk and a data disk. The master contains the main program plus an interactive tutorial that takes you quickly through data entry and retrieval. The data disk already has two files on it for use with the tutorial program. The manual comes in a padded binder with a cover that converts to an easel. The documentation is exceptionally well-written, indexed, and illustrated, and includes a quick reference card for the Apple II+ and IIe. The detailed manual and packaging surpass what you could reasonably expect with a program in this price range. The only shortcoming is the replacement policy: one protected master disk with a ninety-day warranty and no mention of replacement after that ninety-day period if something goes wrong. There is also no clearly defined update policy.

This friendly program is almost impossible to crash. You will also find it virtually impossible to get lost in the program. It performs flawlessly and will appeal to people who want to store and recall information without worrying about key words, data structure, or fields.

MASTERTYPE'S FILER

Scarborough
$49.95
64K; IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	B	B	*Value for Money*

Mastertype's Filer, a faster and improved version of the company's *Phi Beta Filer* program, is a small database designed specifically for home use. It is primarily useful for keeping track of small- to medium-sized lists; phone book, addresses, collections, sports statistics, paper route, etc. Its best feature is that it is menu-driven and easy to use. It comes with nine sample files to which beginners can immediately begin adding their own records without learning how to set up a custom database.

Mastertype's Filer has most of the features of more sophisticated databases; it searches and sorts records using references in various data fields. You can customize your files within the limits of the program; if you have a printer, you can print out your file as either labels or custom column-formatted lists.

The program is weakest in file-size. While many database's limits are defined by memory size (if the file is kept in memory), or by disk size (if the record is saved after additions or corrections). *Filer* allows ten separate files per disk, each containing a maximum of 250. If your database begins to outgrow this limit, it can be split with the Copy function, but the resultant multiple files can't besearched or sorted together. A worse limit is that you can have only ten labels (fields) per record and each of those can be only twenty-four characters long. Also, there is little label-formatting flexibility—all labels are straight down the screen, one per line. Nevertheless, all of these limitations may be unimportant to the average home user who has simple, relatively small lists.

Retrieving information is one of the most important functions of any database. For a simple program, *Mastertype's Filer* shines. For example, you can search for someone named FRED (all input is uppercase) who lives in NY. You just enter FRED in the first name field, and NY in the state field and the program will search through all of the records. If it finds more than one match it displays them one at a time. The program searches through strings as if the search key is a wild card, so it is possible to get a match if the person's name is ALFRED. With NOT in front of the search parameter, you can eliminate records. Likewise, you can search for a number using the =, <, >, or < > signs before the number.

You can sort files alphabetically, low to high or high to low numerically on any field. It takes about twelve seconds to read and sort fifty records.

Reports can either be the standard three-line format or in columns. You tell the program which field or fields goes on which line by entering the line number next to the label. (For example, you would normally put the city, state, and zip code on the third line of a label.) For column format you give the tab position of each column beside the label. There are only two constraints; column width is only seventy-nine columns, and you need to leave enough space for the longest data item in that field or it will be truncated. Items without column tab numbers aren't printed. A "T" placed after the tab number in a numeric field will total the column at the bottom of the report. You can save column formats to disk. One of the most interesting features of this program is its ability to generate multiple choice, or fill-in-the-blank quizzes from your databases. There is a sample file called State Capitals which contains data on the fifty states, their capitals, nicknames, and flowers. If you choose multiple choice, the program reads in all of the data on the two selected fields and sets up a quiz. You can choose states and nicknames, states and

capitals, or even capitals and state flowers. The fill-in-the-blank format could be useful for learning foreign language vocabulary lists.

Overall, the program is quite suitable for anyone who needs to keep simple lists. It is easy enough for almost anyone to use and, with a copyable data disk filled with sample files, even first time computer users can begin entering data without learning the subtleties of the program. All they have to do is read a few pages of the logical and clear user manual and they are ready to enter data.

pfs: File/Report/Graph (IIe Version)

Software Publishing Corp.
$125.00 each
64K; Apple IIe

Overall Rating	B	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	C	*Value for Money*

Business people who own the IIe will cry "At last!" when using this three-program series of small file management, report, and graphing packages. Software Publishing obviously understands its audience and under what conditions their programs will be used. Here's an example. When you have a presentation tomorrow morning and you've only just gathered the information together, absolutely the last thing you want to do is to confront the complexities of a computer business graphing program. What you really need is a tool that will take you from raw data to reports or chart and graphs quickly and easily.

pfs:File/Report/Graph is that tool. It is a system of three separate but integrated packages that combine simply into a single business tool. The manufacturer's claim that the programs "let you use your personal computer without requiring that you become a computer expert" is certainly justified. The tradeoff is that the desirable qualities of speed, ease of use, and reliability limit what you can do with the data.

You begin with *pfs:File* for data entry and storage. It allows you to completely customize your data entry forms. Field labels can be placed anywhere on the screen. The form itself, in fact, can be 32 pages (screens) long. Most of the time a single page will do. The program accommodates one file; about 1,000 records per disk. You enter data simply by tabbing through the various fields and keying in information on the newly created form.

The IIe version offers some enhancements over the previous incarnation of these programs. It allows full use of the IIe's advantages: the keyboard, upper and lower case characters, and 80-column screen formats. But perhaps even more useful are the search routines for paging through the data once it's been entered. It will look for certain numbers, ranges of numbers, blanks, words, letters, exact matches, and inexact matches using "wildcards." It will also look for anything "not" the preceding. Any file made with *pfs:File* will work on the II or II Plus as long as it is in a 40-column format and uses all upper case characters.

pfs:Report is also straightforward in its operation. It produces columnar, tabulated reports from the *pfs:File* data, and uses the same search functions. It has the ability to easily generate new columns which are mathematical derivations of other columns; it can average, subaverage, count, subcount, total and subtotal figures. It orders the report on any field, either alphabetically or numerically. The order is A to Z or 9 to 0. The highest number is reported first, which, when you consider it, is the usual way business reports are displayed. You can designate a reverse, 0 to 9, ranking by using a special trick of alphabetization. Z to A cannot be used.

pfs:Graph produces line, bar, line and bar, stacked line, stacked bar, and pie charts. It does not produce scatter charts. It accepts data from *VisiCalc* DIF files, *pfs:File*, or the keyboard. The program will superimpose four sets of X,Y data on one graph. Entering data for these four is like entering data for four separate charts, again a simple operation. To make data entry easier, after the X-axis data is entered the first time the program repeats the X entries for each of the remaining sets of data. When producing a line graph with numeric X-axis data, the individual data points can be changed to vary in each of the four subgraphs. When the program puts the four together in the superimposed version, it reads all four sets of X-axis data, produces a continuous scale for all of it, and plots each line with its differing X,Y intercepts clearly marked. This is a pleasant surprise when you first run the graphing module. The Y-axis data is always numeric. X-axis data may be any form of date, word, or number.

The graphs produced are black and white or color. In the color mode, the program gives you no choice but arbitrarily selects which colors to use. At times, especially combinations of line and bar charts, the colors it chooses interfere with the clarity of the graph. It is good to have defaults, but being able to alter color choice is a desirable feature. Bar graphs and line graphs provide left and bottom scale labeling, chart titles, and a key to the data involved. The pie charts have a chart title and a key. There is no movable labeling. The program provides automatic scaling which can be eas-

ily changed. The Y-axis data can be displayed in two ways through every type of bar or line chart. It can be displayed either as the actual points, or it will plot a running total which accumulates the Y-axis data. This can be useful if you need to show monthly progress on the way to an annual sales goal.

The graphs are saved as charts of data, not as Hi-Res, 34-sector pictures on a disk. This is a disadvantage if you want a quick copy of the chart, or if you want to use one of the available graphics programs to alter the appearance of your graph. It's a simple change in the program to get the graph onto the disk; future editions of the program should include this capability.

The limitations on the amount of data that *pfs:Graph* will actually plot are a maximum of 36 points for each of the four sets of data superimposed on the chart. This really is as it should be. Other business graphics packages have set the limit far too high and the result is that the labels collide and become unreadable, or the graph becomes so busy as to communicate nothing. *pfs:-Graph* is just right: it always produces a presentation quality graph, precisely what the business person needs. It just cannot do much fancy graphics work, but frequently that isn't what serves most user's needs.

One of the real attractions of these programs is that they integrate into a single system. Data is easily shared and manipulated by all three. In fact, the integration goes beyond the mere ability to share the same data disks. It carries you through visually familiar formats, no matter which module is used. This consistency extends to documentation as well. The user's manuals are uniformly good in their approach, style, layout, and general "user friendliness."

Software Publishing has created an integrated system that is limited in its capabilities but highly reliable and easy to use. Because of the limitations, the price per program seems high. But if you want consistent performance in programs that are easy to understand and use, then you ought to consider this file management system.

QBASE

Applied Software Technology
$189.00
64K; II/II+/IIe/IIc

Overall Rating	C+	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	C-	*Value for Money*

QBASE is a database/report system designed to handle index card-type applications. To take advantage of the report generator, a printer is essential; an 80-column card, while not required, is very helpful for viewing the entire "index card" page format.

QBASE comes with five diskettes. Disk #1, the Design Program Disk, is used to create the file. Information is stored in a user-defined format limited to one page in length. If fields are short, 50 can be squeezed onto the page. There can be only one file per diskette, with a maximum of approximately 904 records. As you approach the 50 field limit, the maximum number of possible records decreases to about 180. The key, used to identify each record in the file, may be one or two fields and up to 40 characters in length. After designing the record form, you may copy it for use in another file, or redesign it even after data has been entered—a very useful feature. The Design Program Disk also includes a system of validation checks to guard against data entry errors, plus provision for default values and computed fields.

Disk #2, the Filing Program Disk, is used for entering and editing data, and retrieving forms. It also has a helpful calculator function with a display area at the bottom of the screen that allows the user to perform arithmetic functions: rounding, changing the sign of a number, and division. The ASSIGNMENT command puts a number onto the form from the calculator display area without re-keying the number.

Disk #3, the Report Program Disk, prints reports based on data in the file. The user designs the report by first selecting the fields, then the total (up to 8 fields) and subtotal (up to 3 levels). Next, he selects the records (using up to 9 criteria), and how to sort the selected records (up to 3 fields), including ascending or descending order. By using EXPORT, the data can be sent to another computer, enabling a word processor program to produce form letters.

Disk #4, the Tutorial/Utility Disk, transfers data from an existing form to a new form containing a different number of fields and/or a different key. It can also print mailing labels. A helpful option here is to delete duplicate consecutive labels.

Disk #5, the Report Work Disk, stores the data temporarily and sorts. Since *QBASE* uses three diskettes for producing a report—the Report Program Disk, the Report Work Disk, and your own file diskette—some disk swapping will be necessary on a 2-disk drive system.

The program's strength lies in its ease of use and the many features it shares with the more expensive *DB Master* program, including a pretty good report generator. Its weakness is a limited file size and few available fields within a record. It's a good little personal filing program, but seems a bit overpriced for an index card system.

QUICK FILE IIe

Apple Computer, Inc.
$100.00
64K; IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

Quick File IIe is a versatile file handling package that eases arranging, entering and extracting information, and preparing reports. Many of the commands are presented in menu form (that is, when you are presented with a table of options, you press one or two keys to order something to be done), and you can call for pages of explanations of the various options at almost any point. While you could start using *Quick File IIe* without looking at the manual, I think that you will find it useful to first read some of the sections and practice with the sample files provided. The book is easy to read and explains the program in a very thorough manner. The disks may be copied by a DOS 3.3 copy program.

The program should work with any common printer and can send control codes for printer set up. I have used it with the Apple Dot Matrix Printer and the manual states that it will run on the Silentype and Qume Sprint 5 printers. I strongly recommend an 80-column card, and an extended card (extra 64K memory) can be very handy. Of course, you will also need an Apple IIe.

You may enter 26 files on one disk, 15 categories in one file, 76 characters in one entry, 20 characters in any category or file name, and 39 or 79 characters in a report title (40 or 80-column display). How many records you enter in one file depends on how much memory is available and how many characters in a record. Apple says that assuming 75 characters per record, you may have 140 records per file with a standard IIe, and 600 if you have the extra 64K of memory. All the records of a file are in the machine at once so it doesn't have to keep running to the disk. Your information may be presented in a "multiple record layout" (columns of categories and rows of entries), or you may "zoom" any record to a "single record layout" with a maximum of 1,140 characters.

All formats for displays and reports are completely under your control. You may specify the categories used, the widths and their position on a line or, for single record layout, their position on the page. Categories deleted to make a specific format are merely hidden and may be restored at any time. Reports may be in "tables" (multiple record) or "labels" (similar to address labels), and calculations using add, subtract, multiply, and divide can be arranged by one or more categories in alphabetical or numerical sequence both forwards and backwards.

You can search for information in two ways. The more complicated allows you to specify up to three characteristics in any of nineteen conditions. *Quick File* uses the Open-Apple key (IIe only) to give you a dozen two-key commands, each of which opens up even more options. One of these is Open-Apple? which presents pages of instructions and explanations tailored for every mode. When you have finally used these choices and prepared the formats you want, entered data and prepared reports, the program will not let you walk away and lose your work, but, instead, gives you more options in saving or ignoring the changes made before going on. If you have *Apple Writer IIe,* you can use your files to prepare form letters or simply merge selected records with an Apple Writer document. I will not pretend that I have covered all of the features available, but I think that you have an idea of the flexibility and power at your fingertips when it comes time to computerize your shoe box full of 3″x 5″ note cards.

There are a few problems with this program. With all the records of a file in memory at one time, you have fast access to, but a limited number of records per file. At least one other program I use (*The Incredible Jack*) lets you have one file on a disk with up to one thousand records. Apple makes some boast about converting almost any date and time entry to a standard format, but they forgot to implement this on the report headers. Moving categories around for formatting can be rather slow, but it is a small price to pay for the fact that you can put things just where you want them. Even with these small bugs, *Quick File* is still a great program and well worth the money.

SPEED FILE

Bluebush
$59.95
48K; Apple II/II+/IIe/IIc
Autostart ROM, Applesoft ROM

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

As far as filing systems go, *Speed File* is unique. It has a strangely humanoid quality that allows random, unstructured filing and recall. Of course, you can institute a structured program with the usual template. *Speed File* uses the contents addressable filing system that matches any alphanumeric string with the entire contents of each record. A very forgiving program, it allows for misspellings or use of the first few letters of a

word in the key sort rather than the whole key. The speed of retrieval is quite amazing—virtually instantaneous. It contrasts strikingly with the speed of filing systems that reside in disk memory; it employs the computer's memory. This approach has one hazard in that an electrical surge may destroy a large amount of your data unless you repeatedly save it to disk, as advised.

For hardware the program requires 48K of memory, an Apple II or II+ with Autostart ROM, and Applesoft ROM in memory. The system also supports the Apple language card or 16K memory cards. It will run on the Apple IIe, but won't support 80-column operations. It supports all commonly used printers without the need for configuration. The package contains the instruction manual and two disks, a system manager disk and a backup.

The program is extremely easy to use, with a well written, well presented, and succint user's guide. The guide and the system manager disk both give demonstrations. The system manager simply helps you create file disks which then contain the *Speed File* program. Once you have created a data disk, you no longer need the system manager disk, which means the whole program functions with a single disk drive. This is not only convenient, it adds materially to the program's ease of use.

Speed File's strengths include its extreme speed, simplicity of use, and above all, its ability to use completely unstructured files. If you need to enter many types of information, you can organize entries with the folder method, giving each a distinct folder name. You can scan folders rapidly. The weakness of the system is that it won't print out a report containing only relevant items. Instead, it prints out items completely, as entered. Along the same lines, although you can use templates, you must print the whole template rather than selected parts.

Despite the minor problem with printing, I highly recommend *Speed File* for its ease of use, speed of retrieval, and uniquely unstructured approach.

VISIFILE

Paladin

$129.00

64K; II/II+/IIe; Z80 card; Applesoft BASIC

Overall Rating	B-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

The *VisiFile* program was designed to replace the *CCA DMS* program, and is more user-oriented than that program. Like all recent *Visi*-type software, the package possesses an easily comprehended, menu-driven structure, and a well-written and straightforward manual. You will find the functions easy to understand, and, having read the manual, will probably not have to consult it except for rarely-used functions.

Since the *VisiFile* program essentially replaces *CCA DMS*, a question immediately arises as to whether CCA files will convert to *VisiFile* formats. This presents no problem other than that faced in taking any thirteen sector CCA files to Muffin to sixteen sectors. You simply rename the data files along with the Maintfiles file. You can only convert the data files; you cannot convert the report, label, and index files. Instead you must reconstruct them using *VisiFile*. One benefit of conversion comes with the exclusion of the field identification used by *CCA DMS*, which means that you need use only the field name for record retrieval and updating.

VisiFile constitutes a flexible file management system. It stores information in fields within records contained in a file. Multiple files may occupy the same disk, but I would not recommend this for large files. All records must fit on one storage disk (about 10,000 single-page types allowed). Each record contains up to 232 characters, consisting of up to twenty-four fields. You can define fields in alphanumeric or numeric format. Numeric fields reach up to thirty-eight numbers in length.

The flexible formatting capability of this program makes up one of its most useful and interesting features. With this option, you can change your data formats (within the maximum constraints, of course) at any time. For example, you might need to change your address files from a five-digit ZIP code to a nine-digit one. With *VisiFile* you can do this without reentry of data. The program inserts blanks in all the proper fields, and as you acquire the new information, you simply append them to the existing ZIP code field in each record. A side benefit of this flexible formatting lets you create new files from parts of other files, combine two existing files, and create partial files.

File definition is straightforward and quite easy. On data entry, you can employ the mapping automatically established by the program, or you can remap the fields so that some display on one page and others on the next page. You might find it disquieting to see only part of the entry at one time, but this results because the fields overlap the screen in size. As you enter data, the previously entered data scrolls off the screen to the left. On returning to accept the data, only the leftmost portion appears on the screen, forcing you to remember where you left off, because you cannot see it.

Editing of data entries is easy. You can insert or delete letter by letter, or clear to the end of the line with

the cursor. This adds to the versatility of the program.

I did encounter a rather serious problem with the program. I could not configure the system for my serial printer, a Diablo 1620 interfaced through the Apple Serial Card. Thus, I could not review the printer report generation functions. The formats appeared to work when sent to the screen, taking the 40-column width into account.

You can produce both reports and labels with *Visi-File*. Report width ranges up to 225 characters in length. Labels utilize a variety of formats, up to five across the printer page. Computed fields are available on output with formulas that you specify. Be sure to read the manual carefully, since the formulas read from left to right and parentheses are not permitted. You must exercise care to produce the correct results.

You can create as many indices as you wish, but only one is active at a time. When you enter data, therefore, you must update the associated indices afterwards. The indices do make possible relatively rapid location of the data.

If you use other *Visi*-type packages, you will find one of the program's abilities of particular use: *VisiFile* can create Data Interchange Format (DIF) files from the database. You can then read these files directly into the other programs for spreadsheet calculations (*VisiCalc*), plotting (*VisiPlot*), or statistical manipulation (*Visi-Trend*). Of course, you can access the data files created by writing your own applications programs.

The *VisiFile* program makes an excellent addition to other *Visi*-type applications. The flexible formatting features make it extremely useful, since you can adapt its basic form for many different uses. If you require a versatile file management program and can live within the short record constraints imposed by this one, then by all means consider *VisiFile*.

Database Management Utilities

DB MASTER STAT PAK

Stoneware
$99.00
48K; Apple II+/IIe/IIc; *DB Master (Version 3 or 4)*

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A	*Value for Money*

DB Master Stat Pak extends the range of statistical information that you can calculate for data stored in *DB Master* files. *Stat Pak* performs mean and standard deviation calculations and other powerful statistical tests, including linear regression, correlation, and chi-square analysis. It differs from the Statistics option of the *DB Master* report generator (which generates mean and standard deviation figures), in that it calculates without printing a report.

The documentation provides an excellent tutorial on operating the program, interpreting the statistical test results, and using statistical tables. However, you still need a basic understanding of probability and statistics.

Like other *DB Master Utility Paks*, you cannot boot *Stat Pak*. You must access it via the File Maintenance option on the *DB Master* program disk. *Stat Pak* covers when to use the various statistical tests, how to interpret the results, procedures specific to running each test, and sample test results with interpretations.

The option for mean and standard deviation calculates the mean, standard deviation, standard error of the mean, and coefficient of variation. It also sorts data and arranges it into a frequency distribution. The Mann-Whitney and Wilcoxon tests compare the means of two populations, as does the t-test for either paired or unpaired populations, but they make fewer assumptions about the sampled populations than does the t-test and thus can be more widely applied. The Mann-Whitney test uses unpaired data and the Wilcoxon test uses paired samples.

Stat Pak also computes the one-way analysis of variance (ANOVA), which compares the means of more than two populations. Chi-square analysis determines whether two different traits or characteristics in a population are independent of each other. For example, it can help you decide if hair color and sex are dependent or independent traits in humans. Likewise, linear regression and correlation help you decide whether two variables are linearly related. For example, you could test for a linear relationship between calorie intake and weight gain in humans. The program only supports first order analysis, of the form Y=mX+b.

All data from a *DB Master* file must be numeric, which can result in numerous calculations for large data files. You must then piece together the different sets of calculations. This approach does not yield statistically correct answers. Therefore, unless you want a small sample, you must determine the selection criteria for your files so as not to exceed 350 data items (the maximum number that *DB Master* can process). After specifying the data elements and statistical test, you enter the maximum number of decimal places you want reported and tell the program which data values to ignore during calculations (such as zero or null entries). *Stat Pak* then carries out the test. You can display the results on the screen or dump them to the printer.

The appendix provides all the equations (standard formulas) used in this program. Since the program limits the data to 350 items, it introduces no assumptions on large data pools. I checked the results of the calculations against those from the same tests run on a mainframe system and checked by hand. I then ran a t-test on the comparison and got .999, indicating high statistical accuracy of the *Stat Pak* results.

Overall, I thought *Stat Pak* an excellent module. Its documentation is by far the best of those for all the utility packs. The program provides most of the important statistical tests and has only three limitations: only 350 data samples, just a first order polynomial in linear regression, and no F-test. Since most people don't need the last two items, the limitations aren't significant. *Stat Pak* makes a valuable addition to *DB Master*.

DB MASTER UTILITY PAK #1

Stoneware
$99.00
64K; Apple II+/IIe/IIc; *DB Master (Version 3 or 4)*

Overall Rating	A-	B	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B-	A	*Value for Money*

This most useful of the *DB Master Utility Paks* includes options to translate DIF files, restructure files, replicate and merge files, and recover damaged files. The DIF option lets you use standard text files and write your own special purpose programs to work with *DB Master* files or interchange data with other programs supporting DIF files.

You cannot boot this program; instead, you must access it from the *DB Master* Main Menu (via File Maintenance). The first and most powerful option, Restructure File Format, allows you to change the format of a file, including changing field types, labels, and screen locations. You can add or delete fields and add a screen page of additional fields. Once you have finished designing the new format, the program creates a new file containing all the data (or selected data) from the original file. It reads records from the original file, modifies them to fit the new format, and writes them to the new file.

The Replicate File option copies everything from the original file except the data: report formats, short forms, etc. In other words, it's an empty file. This allows you to use the shell for various applications, such as monthly files, active accounts, or to recover crashed files.

Merge Files lets you combine records from separate files into a single file if they have the same format. Create or Change File Defaults lets you change data entry defaults permanently. The Recover module can recover most records from files on disks which *DB Master* can no longer read or access (although you need an intact utility disk). Unfortunately, the program has no option to recover a bad utility disk, only data disks.

The sixth option (included in *DB Master Version 4*) allows you to reset the number of records in the file indicator. The program displays this figure for your convenience when checking file statistics. The number will be wrong only if you exit *DB Master* without first closing the files; even so, it won't affect the file in any way.

Translate a File lets you turn *DB Master* files into files accessible by normal Apple DOS. The sequential text file conforms to the specifications of the Data Interchange Format (DIF). Large *DB Master* files can expand to several DIF disks because the files aren't compacted. *Utility Pak #1* will prompt you when a DOS disk is full. (*DB Master* tends to occasionally introduce extraneous characters into DIF files, but this occurs only when you have selected a few fields from a database.)

The Restructure, Merge, and Translate functions include an option to choose a subformat in selecting the records you want to modify, combine, or translate. If you choose to modify a select format, that change is included in any of the reports using the same format, as if they too had been changed.

The inadequacy of the documentation constitutes the biggest disadvantage of the program. It fails to explain many of the screen prompts, which can result in your destroying a file. For example, near the end of the Restructure Format section, the documentation says to "simply follow the directions on your screen." There are no explicit directions on the screen, only a menu of several options. If you choose the wrong one, you may destroy all the work you've just done.

Overall, *Utility Pak #1* is the most versatile and valuable of the utilitiy packs for *DB Master*.

DB MASTER UTILITY PAK #2

Stoneware
$99.00
64K; Apple II+/IIe/IIc; *DB Master (Version 3 or 4)*

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	B	*Value for Money*

DB Master Utility Pak #2 provides additional capabilities for owners of *DB Master*; however, Version 4 includes some of the same capabilities, which means that many new owners won't need this program. Features include a global editor, label printer, transaction file merge, reblock, and file statistics. You access the program from within *DB Master*, using the file maintenance option. As the documentation says, error trapping is not very extensive, so you should back up your data and utility disks.

The Global Editor lets you delete or replace all or selected records in a file. You can make up to five different edits in one pass. The Label Printer is a better label report option than that included in *DB Master*, allowing you to print one to five labels across. It eliminates blank lines and supports variable spacing. Transaction File Merge lets you edit data in one file based upon information stored in a different file. It only works with numeric and dollar fields and applies to a limited number of operations. Reblock for extra space

comes on the program disk of Version 4 but not Version 3. It has limited applicability for hard disk users because it is used primarily with large files or those close to splitting onto another. It creates another data disk, removing extra spaces from data storage in order to shrink the file to its optimum size. This leaves more storage room on the disk. Change Protected Fields lets you change fields from read-only status to normal and vice versa. Version 4 of *DB Master* includes Printing Data Entry Forms. It lets you print both data entry forms and the *DB Master* short form. Finally, File Statistics is the same as that in the file maintenance option of *DB Master*.

Overall, *Utility Pak #2* has some good options, especially the global editor and label printer. Although you can accomplish the same things from the parent program, the utility pack lets you do so more effectively. It helps streamline operations if you do a lot of global editing or label printing (while the other options apply to more specific needs).

MODELING

Introduction

The programs reviewed in this section offer you the chance to play "what if?" games with just about any problem or set of information you can think of. Some of the programs are spreadsheets—those managerial problem solvers that many experts say made the Apple II a viable product—others are project management programs that help you schedule time and allocate resources, statistical packages, and other types of specialized models

Spreadsheets and modeling programs are the most basic, and the most versatile modeling tools available for Apple users. But because of their flexible nature, they require a relatively high level of expertise and understanding to master. You have to understand your problem, and understand how to put it into formulaic terms a spreadsheet can understand, before you can compute any useful information about it.

What A Model Does

Most spreadsheets include routine calculations that save you the time of constructing complex formulas. Some spreadsheets are heavy on the financial formulas with things like Internal Rate of Return and Depreciation, others are intended for statisticians and include Standard Deviation, Linear Regression, and so forth. Some of the following programs are devoted to solving only these types of problems. Very simple spreadsheets include only simple math, trigonometric, and Boolean functions. If you don't need an elaborate model, and you'd like to combine your spreadsheet with a database or word processor, look into the Integrated section of this book for programs that can handle all these functions at once.

Basic functions may be all you need if you're just trying to keep track of earnings for your corner grocery store or figure out the best way to finance a new VCR. But countless numbers of scientists and businessmen use very complex spreadsheets to construct models of their work. The advantage of using a microcomputer spreadsheet over pencil and paper is the computer's ever-forgiving RAM. Once you've set up your model—that is, the shell of equations and permanent data that represents your project—you can plug in variables and recalculate the results repeatedly until you get an answer you like. For example, in tracking your grocery store's finances, you can enter your rent payment as permanent data (until the landlord raises it, of course). Your gross income is a variable, but the places you spend it—rent, payroll, insurance, buying inventory, capital expenditures, a Keough account—are permanent, and you can probably come up with formulas to represent how your gross income is divided among them. If your Keough, insurance, and payroll payments are all set amounts, and you always sink a certain percentage of income into restocking the shelves, you can easily figure out how much mad money is left over for capital improvements like that new magazine display rack you've been eyeing.

Once you've got all the permanent information in place you can plug in various variables to see what you get. Including a variable for your average markup will allow you to see the result of increased prices across the board. But you have to consider decreased sales if your customers start going to the store down the block because you're charging so much. You can see how easily a simple model grows into a number-crunching monster.

The key to understanding models is to realize that they are representations, and as such they may or may not give useful results. Even the most elaborate model only simulates a situation. How many times can you remember the very best analysts making glowing prognostications about how the stock market is going to perform, only to have their predictions proven completely false? The same can be true for any financial model you build. Remember, the computer is a logical machine, but human beings, by nature, are illogical, unpredictable creatures that, given half a chance, will do their best to invalidate your carefully calculated results.

Computer modeling is a classic case to which the time-worn statement GIGO (Garbage In, Garbage Out) applies. Not only must the model be a valid representation of the situation, but your assumptions about the institutions and people involved, and your data must be equally accurate.

For Complex Jobs

Our grocery store example is really very simple, and, while the store owner might appreciate using a computer for it, he really wouldn't use up that many erasers doing the whole thing on paper. Where spreadsheets really shine is with large, complex models designed to predict important results. To insure valid results for these, statisticians give us a way to understand and possibly minimize, if not eliminate, errors by obtaining the "most probable result." You construct the model using reasonable or known laws to be reasonably certain that the logic is correct. That makes the largest potential source of error the data you feed into the model, rather than the model itself. To minimize that margin for error even further, you should input many data sets (defined by specific rules) and run the model thousands of times to generate a range of outputs.

In financial modeling lingo, this statistical process is called "simulation." Under this type of simulation, you must estimate the probability that any given set of inputs will actually take place. This is not a trivial task; as you might expect, it can have a profound effect on the spread of the output.

The justification for using this type of model is based primarily on the determination of risk. In most cases, neither the very worst case nor the very best will happen, so no extreme results will occur. The simulation gives the manager some idea of the riskiness of a particular strategy.

As an example, IRAs (Individual Retirement Accounts) are considered risky because of the heavy penalty for early withdrawal. However, analyzing them using simulation techniques, you find that an IRA is a good investment if you do not take early withdrawal in the first five years or so (depending upon your numeric assumptions). It's up to you to decide if you are likely to need the funds within that five year period. Fortunately, most personal computer users simply don't need true simulations. A simple model of a particular situation, given a few test runs with specific sets of input data, is adequate, and takes a lot less time and effort. This approach is classically termed "deterministic," and the manipulation of the input data around a given case is termed a "sensitivity analysis."

The difference between spreadsheets and modeling programs (also called compilers) lies in how data and formulas are entered and used by the program, and how you interact with the program.

Spreadsheets

The spreadsheet programs display your data and formulas in rows and columns. This display is generally a window into a very large electronic worksheet. You enter your model into the worksheet at row/column intersections called "cells." Each cell may have text, data, or a formula which relates that cell to any other cell, or combination of cells, on the worksheet. Typically, when you enter something into a cell, the spreadsheet instantly takes the entry into account, refiguring any other cells it affects.

When you choose a spreadsheet program you should consider: how the program displays the worksheet; the ease of model entry; how data files are handled; the printed output from the program; and what financial functions are built in.

Compilers

Compilers rely on data and/or logic files which contain the model's variables and formulae. They usually do not produce a display or report in a row/column format. Once the file is created, the program reads it and performs the specified calculations. You can have the output displayed either on the screen or the printer.

Spreadsheet and compiler programs are affected by the same problems, but in different ways. In shopping for a compiler program you should consider display, ease of model entry, how files are handled, printed output, and what financial functions are built into the program.

Compilers generally produce better reports than spreadsheet programs. Compiler programs usually allow you to specify exactly what lines are to be printed. This means that only the data which relates directly to the problem at hand need be printed, making your report more concise. The one

drawback of compiler programs is their slow response when you change the logic of the model. Most compiler programs allow some data to be changed without re-compiling the model, but any changes which modify the computational rules (the logic file) force a re-compilation of the file—and this takes time.

Modeling Utilities

Modeling utilities are logic files—the shells of formulas and permanent data that we mentioned before—that work only with certain modeling programs. Some simply add specialized commands or facilitate easy data storage or transfer. Others are elaborate templates for specific types of analysis. They save you the time and frustration of analyzing your needs and designing a model from scratch, assuming you can find a ready-made package that fits your bill. If you are not familiar with the calculations that go into the type of model you want to create, find someone who can do it for you. Unlike game programs, these system models demand that you know what you are doing from the outset. We've specified which spreadsheet or compiler each modeling utility runs with, along with memory requirements and models under the price of each program.

Project Managers

Project management programs are very specialized compilers. You enter information about your resources and the requirements a given project, and they help you keep track of its progress. They display your information in a variety of ways including flow charts and Gantt charts. You can change personnel, due dates, critical task flow, and so forth, to see how such changes affect the project's outcome. You can also use the printed chart as a guide for your employees and as supporting documentation for financial backers or your boss.

Computer modeling can give you a terrific increase in control and efficiency, or it can be a frustrating waste of time and money. Approach it with the proper preparation, and you will certainly benefit from the computer's taking over a lot of boring but useful drudgery.

—Mia McCroskey
(based on *What If?* by Tom Simondi;
Arrays, Inc./The Book Division, 1983)

General

CALFEX

Interlaken Technology Corp.
$250.00; $295.00 with graphics package
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B+	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	A	B	*Value for Money*

CALFEX is a menu-driven software program intended for use by engineers, scientists, mathematicians, students, and others who deal with mathematical equations. It is a specialized program, so its value depends on your particular needs.

This program is targeted for the technician who has a frequent need to examine the "What If?" questions relative to an equation with a number of variables. It provides a preprogrammed format for problem solving and does a great deal of tedious work for you.

You enter your equations into the *CALFEX* format. You are then walked through the procedures, step-by-step, of identifying the variables, assigning labels, and determining input values. One or several sets of values can be stored and used later in the analysis activities. Simply pressing a few keys initiates the calculations and provides the answers. Entries can then be changed and the variables investigated. The labels are always displayed so you don't have to remember which is which. Up to 120 independent and 120 dependent variables can be used as simple or array variables.

The software package is easy to use since everything is progressively accomplished starting from a single Main Menu. There are no unique symbols or commands to be learned or remembered. You soon learn to operate the program quickly and effectively without depending on the menus. Error trapping/handling is well thought out and has been designed into the software at the most appropriate places. Single key entries are the usual requirement, and are often made unnecessary by an automatic response to an acceptable data entry.

Progress through an equation can be easily and quickly documented via the printer function. Inputs and answers are printed complete with labels so anyone can read the printout. Space is provided to allow the addition of the user's name, the date, and any additional comments. A very useful feature automatically provides maximum and minimum figures when you are using the Variable Exchange mode and there is no direct solution for your desired equation.

Other features that merit mention include user definitions and the inclusion and storage of frequently used constants, functions, and subroutines. Up to ten simultaneous equations can be solved. Numerical integration for any function can be performed. With this you can choose the limits for integration and decide on the number of intervals to be analyzed.

The screen presentations are adequate but unimaginative. Utility seems to be the primary thrust. The program is well documented, offers step-by-step instructions, and reflects a great deal of professionalism throughout. A large number of pictures reinforce the learning process as it progresses. Where necessary, you are diverted to detailed appendices for further explanation of a specific concept or technique.

The plush binder notebook contains the usual storage pockets for added notes and memos. A package of Log Sheets lets you record the theories behind the equations. The variables and explanations can be written down and maintained for future reference.

The program disk is copy-protected and cannot be backed-up. Interlaken Technology has, however, included a duplicate copy of the program disk on the reverse side of the master which can be used in the event of a problem with the original. This method of back-up protection leaves a lot to be desired.

DECISION MAKER, Version 3.0

Pratt Medical Group
$800.00
64K; II/III

Overall Rating	C-	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	D	D-	*Value for Money*

Decision Maker is a Pascal-based program that helps you solve decision trees and thus determine the optimal decision from among several mutually exclusive possibilities. The program computes the maximum expected value associated with each decision path and then recommends a decision based upon those values.

It offers no option for solving a minimization problem, but converting values to negatives and solving for the maximum is supposed to do the trick. The program was originally written to help surgeons make decisions on whether to operate or not given defined circumstances. For this reason results are expressed in terms of utility instead of dollars, but you can substitute dollars without problem.

Decision trees consist of two basic connected nodes. The decision node represents a choice that you must make and occurs at the place in the tree that the decision must be made. Event nodes are not under your control. They represent chance events whose probability you must know or estimate. Some people also identify a terminal node, which represents the ultimate consequence of a series of actions. When you build a decision tree you must enter the complete sequence of decision and event nodes leading to each terminal node. You then specify the utility of each terminal node and establish all intermediate probabilities. The program uses expected value calculations to "fold back" the tree and determine the optimum decision (assuming your entries are correct).

When constructing a decision tree you should begin by sketching it out on paper. If you don't, you may miss something. The program guides you through the entry process, keeping track of decision and event nodes as you enter them, completing one branch at a time, but you must keep track of the various nodes you have defined. It is easy to get lost in a large tree. The program uses one trick to help you, "binding" already created portions of a tree to another portion. This avoids recreating parts that apply to several areas.

Decision Maker accommodates two other types of node: label and Boolean. The label node helps you annotate portions of the tree; it does not enter into the calculation of an optimal decision. It is a single input, single output point on the tree. The Boolean node controls the tree. Each branch associated with a Boolean node has a logical expression tested as True or False (True is greater than 0, False is less than or equal to 0). In evaluating a Boolean node, the program tests each branch for a True expression. Control passes to the first True found and to the last branch if no True is found. Think of the Boolean node as a switch. The node's utility equals the utility of the branch picked by the "switch setting."

You can define event node branches with variables rather than specific probabilities. When you do this, you can create a variable table to establish their values. Changing the table for subsequent runs shows you how the decision changes when the variables take on new values. The program will even perform a sensitivity analysis for you if you wish. Although changing one variable at a time is recommended, you can extend that to a second variable. The program produces a crossover point where you are indifferent among choices and a low resolution graph using standard ASCII characters (not the Apple Hi-Res screen).

You can edit trees, but you must know what it looks like. When you change the definition of any node you must re-enter all information associated with that node. You can link subsequent nodes to the new node as appropriate. You can also edit the text file that represents the model, using the Pascal editor, but you should be completely familiar with the structure of that file first. The manual does not adequately describe the structure. In fact, the manual is poor at best. It includes all the information needed to run the program, but you must dig to find the key points because of the organization and presentation of the material. Discussions relate to medicine rather than business even though you can use it for a great many non-medical situations. It offers few figures, poorly presented.

When you receive the program you must add Pascal system files to the program disk before using it. The manual includes instructions for doing this, but you should know something about Pascal before attempting to set up your working copy of the program.

Decision Maker does a good job of documenting and computing a decision tree in most decision-making situations, but this otherwise reasonable program is poorly presented and expensive.

MICRO-DYNAMO

Addison-Wesley
$245.00
64K; II; Pascal Editor

Overall Rating	B	B	*Reliability*
Ease of Use	C-	B	*Error Handling*
Documentation	A-	C	*Value for Money*

A powerful tool, *Micro-Dynamo* models such system dynamics (the evolution in time of anything that can be modeled mathematically) as population growth, urban decay, financial planning, inventory control, chemical reactions, and planetary motion. It does this by providing a simple way to break up the system and follow each part as a function of time. Modeling takes place in Pascal, and your results appear in high-resolution graphics. Despite applications in science, economics, business, and education, the core of the program consists of the mathematical model used, a set of coupled first order differential equations. *Micro-Dynamo* avoids any mathematical complications and concentrates on concrete applications, which can prove awkward for scientific users. Written in Pascal, the program uses the

Pascal editor for program input. You enter a description of your model using a specialized set of program statements that allow you to define constants, variables, and functions, and to specify such factors as initial conditions, time interval, and output format. Learning the program language is not easy, but easier than learning a true computer language, like Pascal. Some unique features offset this difficulty, such as the ability to modify some model parameters even after a program has been compiled. Also, program statements need not be in strict order, since the program re-orders them at compilation. You can also change output easily and quickly to rescale or to display any subset of the model parameters (up to four at a time).

The excellent documentation for the nonmathematical aspects of *Micro-Dynamo* divides into roughly equal tutorial and reference sections. Both are clearly written and loaded with examples. The tutorial takes you through some of the intricacies of the Pascal Operating system (mainly filer and editor), provides practice editing a model, and takes you through all the steps needed to run a simple model. The reference section defines the program's language, and provides a complete list of all features, options, and errors. Frequent, well-written examples clarify explanations. In fact, the only thing lacking in the documentation is an appendix discussing the mathematical foundation of the program language.

Although I found *Micro-Dynamo* impressively powerful, not everyone needs its abilities, particularly if that means learning the program language and dealing with the Pascal Operating System. Scientists and mathematicians can use more powerful differential equation solving programs, but businessmen and social scientists will find few (if any) other programs for small computers with the same power and flexibility for modeling the time evolution of complex systems. For those wanting a more complete description of system modeling, Addison-Wesley offers a companion book called *Introduction to Computer Simulation: The System Dynamics Approach*, which contains numerous models for study.

MICRO-SIM II

Decision Tree Software
$48.95
48K; II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Micro-Sim II performs a net present value (NPV) simulation. It makes available, through the use of random numbers with a "best/worst/most likely" scenario analysis, information used in dealing with risk and uncertainty in capital budgeting decisions. If you don't understand what you've just read, don't get this program. As the introduction to the manual says, you must understand capital budgeting and net present value to use this program to full advantage, because it won't teach you.

The program is so simple to operate that you don't need the manual; the input prompts are self-explanatory. It requires you to enter information on the required rate of return, marginal tax rate, data on a new asset such as cost, depreciation, and salvage value, and data on the asset being replaced. You also enter information concerning increased sales and changes in operating costs. Many times you won't know these things with any degree of certainty; that's where this program comes in. You can enter these various inputs for the best, worst, and most likely conditions, and their probability. You can request the program to run any number of passes in its calculation and, when it finishes, it gives you the estimated net present value, the standard deviation, and the coefficient of variation for the calculations. A useful tool, *Micro-Sim II* can help you plan your capital budget.

The operating instructions come in the program as well as in a separate document. The documentation takes you through a sample run, which is nice but not really needed; the prompts and the instructions are sufficient.

When the program runs its calculations, it gives you the results of each step as well as the final figures. You can obtain hard copy of these results. Normally, you won't really need the intermediate results, but you don't have any choice if you've selected printer output. A printout includes all the intermediate results, not just the final figures.

If your work involves making capital budget decisions, you may find this a very useful program. A capital equipment salesman pointed out one use: the program can function as a selling aid if you give these figures to a prospective customer. Just don't expect this program to teach you capital budgeting.

Spreadsheets

		Minimum Requirements	Copy-Protected	Tutorial	CP/M Required	Grades: Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Math Functions	(IIe/IIc)	Conditional Functions	Financial Functions
Advanced VisiCalc for the Apple III III	**$395.00**	128	●	●		C	C	B-	A	B+	C	A	A	A	C
CalcStar II, II+, IIe, III	**$$99.00**	64			◐	B+	A	B	A	B+	B+	A	A	A	A-
FlashCalc II+, IIe, IIc	**$99.00**	64	●	●		B	B	C-	B	B	B	A	B	A	A
MagiCalc II, IIe, IIc	**$$99.95**	48	●	●		A	A	A	B+	B+	A	A	C	A	B-
Multiplan II, II+, IIe, IIc	**$195.00**	64/ 128	◐			A-	A	B	A	A	A-	A	A	A	B-
Senior Analyst III III	**$225.00**	128	●	●		B+	A-	B+	A	A-	B+	A	A	A	A-
The Spreadsheet, V.2 II, IIe, IIc	**$75.00**	48		●		A	A	A	B+	B+	A	A	C	A	B-
SuperCalc² II, II+, IIe	**$295.00**	48			●	A	B+	A	A	A	B+	A	A	A	B-
VisiCalc 3.3 II, II+	**$100.00**	48	●			B+	A	A	A	A	B+	A	A	A	B
VisiCalc for the IIe IIe	**$250.00**	64	●	●		B-	C	A	A	A	B	A	A	A	C

● = performs this function or has this feature

◐ = partially performs this function or has similar feature

Minimum Requirements—The minimum amount of memory required by the program (in kilobytes). Two numbers indicates alternate versions of the same program (see the review for explanation).

Copy Protected—The user cannot copy the disk. Backups may be supplied by the vendor for a fee.

Tutorial—Step-by-step instructions for getting started and using the program, either on disk or in the documentation. Tutorials often use sample text provided on disk.

Math Functions—The program's ability to support the basic math functions, such as addition, subtraction, multiplication, division, exponent, average, sum, count, etc.

Transcendental Functions—A program's capacity to support log (base 10), log (base e), and trigonometric functions.

Conditional Functions—Less than through greater than, AND, OR, NOT, and IF...THEN...ELSE.

Financial Functions—Special functions, such as linear regression, standard deviation, depreciation, internal rate of return, net present value, etc.

CP/M Required—A Z80 card is required in order to run the program.

Color—The program uses color to good effect (i.e., different colors for either different areas or types of numbers; the use of red for negative numbers, for instance).

Sheet Formatting—Easy worksheet formatting (varying column widths, formats, etc.).

Cell Formatting—Simple formatting of individual cells for display of numbers or text (justification of an entry, adding special characters, such as "$," and so on).

Print Margins—Upon printing, you may specify the margins for your paper.

Formatting and Use															Doc.	
Color	Sheet Formatting	Cell Formatting	Print Margins	Printer Setup	Print Formulae	Partial Models	Data Transfer	Low Resolution Graphics	High Resolution Graphics	Slide Show	Sorting	Data Query	Telecommunications	Word Processing	Index	Ref. Card/Keyboard Temp.
		◖		●	●		●	●							●	●
	●	◖			●	●									●	
	●	●	●	●	●		◖								●	●
	●	●	●	●	●		●	●							●	●
	●	●	●	●	●		●	●							●	●
			●	●		●							●			
	●	●	●	●	●		●	●							●	●
	◖	●		●	●	●	◖	●							●	●
		◖		●	●		●	●							●	●
		◖		●	●		●	●							●	●

Printer Setup—Printer setup codes may be issued to make use of your printer's special capabilities.

Print Formulae—You can print the logic behind your model, as well as the model itself.

Partial Models—The program allows you to save or load parts of a model to create libraries of functions for later use.

Data Transfer—The capability to import/export data using one of the standard foramts, such as DIF.

Low Resolution Graphics—The production of simple graphics using ASCII characters on the screen or printer.

High Resolution Graphics—The program produces good looking graphics, making full use of your computer's screen.

Slide Show—A program's ability to save graphs and recall them later in an order that approximates a "slide show."

Sorting—You can sort rows or columns based upon entries in a particular row or column.

Data Query—The program allows you to establish criteria that it will use to pick only those entries you designate to form a group of rows or columns.

Telecommunications—The program can work directly with a modem for data pickup or transfer to another computer.

Word Processing—Editing capabilities beyond a single cell or row/column.

Index—An alphabetical list with page references to help you find information in the manual quickly.

Reference Cards/Keyboard Templates—Some form of card, folder, or poster with brief explanations of the program's commands that you can keep by your computer.

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Spreadsheets

ADVANCED VISICALC FOR APPLE III

Lotus
$395.00
128K; III

Overall Rating	C	A	*Reliability*
Ease of Use	C	B+	*Error Handling*
Documentation	B-	C	*Value for Money*

Advanced VisiCalc for Apple III differs from the original *VisiCalc* mainly in taking advantage of the many things that the Apple III has to offer: extra memory, 80-column display, and extra cursor keys. Moreover, VisiCorp programs continue to support DIF (Data Interchange Format) files to facilitate data interchange. An appendix describing DIF files even includes Business BASIC listings to dump, print, or create a DIF file.

The package contains three disks—a master, a back-up, and a disk containing sample files. The boot disks are copy-protected, so be very careful with them. The SOS.DRIVER file included on the disk is set up for Apple IIIs with two disk drives (one built-in and one external), a standard console, and a Silentype printer. (I don't know anyone with a Silentype for their III.) The SOS.KERNEL file is revision 1.1 rather than 1.3, which has been out for over a year. Similarly, the drivers came with 1.1 and need updating. Be careful when updating the SOS.DRIVER file, because repeated writing to the disk can garble the copy-protection system and leave you with an unbootable master disk. The method described for updating the file works, but is unnecessarily involved. You can alter the write-protect status of a file from the Utilities disk without booting Business BASIC (or Pascal). Be sure that you name your printer driver .PRINTER if you want to use the /PP command to write to the printer. Otherwise, you will have to treat the printer like a file and use the /PF command.

Advanced VisiCalc for Apple III includes two manuals and a Pocket Reference. Although clearly written, the manuals require frequent reference to the index because related topics rarely appear adjacent to each other in the User's Guide. I also wish that they were more complete. One of *VisiCalc*'s best features is its ability to help you create templates for frequently used functions, yet the manuals give extremely short shrift to the creation of templates.

Clearly *VisiCalc* was one of the first programs available for the Apple III—it exploits none of the unique capabilities of the machine, offering no Help screens or interactive Help command, no use of the Function keys (the Open and Solid Apples), no windowing for split screen operation. Finally, the error messages lack clarity. All of these problems induced me to give *Advanced VisiCalc for the Apple III* low grades despite its usefulness and reliability. A drop in price, a rewritten User's Guide, or updated disks would help immensely.

CALCSTAR

MicroPro International Corp.
$99.00
64K; II/II+/IIe/III

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B+	*Value for Money*

CalcStar is a spreadsheet program similar to *VisiCalc* and *SuperCalc*. It is designed to be compatible with other MicroPro products, such as *WordStar* and *DataStar*. All are similar in appearance when on screen, and have standard and cursor control and editing control keys, so that any given control key performs a similar (or the same) function as any of the programs. This makes use of this family of programs easier. As with other spreadsheet programs, *CalcStar* has spreadsheet coordinates far in excess of what can actually be filled in (because of computer memory limits). With a 56K Apple CP/M configuration there is space for approximately 600 entires, with each having a twenty-six character limit. Digits are carried internally to twelve character accuracy.

Text or numeric entries are recognized by the first character typed. You can also change the type and use

the entry line as an immediate mode calculator. Formulas employ the standard operators, with the handy addition of a reference text that may be added to a formula after a backslash ("\") delimiter. This is handy when you are deep within a spreadsheet and do not have the title lines visible. Only one problem was encountered on entry: the back arrow key does not erase text; the Ctrl-@ must be used.

Cells within the spreadsheet may be individually formatted to include the numeric precision displayed. A help screen is displayed at all times, but may be deleted on command in order to add five rows to the display. If more help is needed, two screens of help data are available on command. A form of protected data is available with auto entry, allowing access to only the cells with form mode set. In addition, files may be saved with or without password protection. On recall, other forms may be merged into the existing form, and the formulas are automatically adjusted for the new location.

Output may be to a disk, the screen, or to a printer. When output is to a disk, provision is made for comma delimited files, so that the data may be entered into programs like *DataStar*. During output to a printer, the program will segment the output of page width. Title lines are allowed, and page breaks may be forced by appropriate symbols entered into the spreadsheet.

The file saved by *CalcStar* is not a standard text file, and requires a special program (which is provided) to output the contents. The built-in math functions are Sum, Cnt (count), Avg, Max, Min, Sqrt, log, Ln, Abs, and Exp. *CalcStar* also has a built-in forecasting function using linear regression (straightline approximation). The command: Regr (<independent variable range>, <start of dependent variable range>) prints the mean of the dependent values in the cursor cell. Following this, three other functions will forecast:

Proj (ind var): Projects dependent variable best fit.
Depd (dep var): Projects independent variable best fit.
Slope: Gives the slope of the regression line.

Each of these functions operates on the last Regr function computed. Finally, conditional expressions can include the classic form of If...Then...Else.

CalcStar is a viable entry into the spreadsheet market. It is somewhat limited in memory, but this may be made up with the forecasting functions that are built into this program, but not into the others like it. It desires your serious consideration, especially if you have other MicroPro products.

FLASHCALC

Paladin
$99.00
64K; II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C-	B	*Value for Money*

Back in 1978, there was *VisiCalc*, the very first spreadsheet software. According to a lot of people's reckoning, it was this program that virtually made the Apple II. Then came "VisiClones" by the dozen. They offered improvements, but were more like *VisiCalc* than they were different from it. Now VisiCorp has cloned itself with *FlashCalc* and Paladin.

Some reviewers think Paladin, VisiCorp's successor, is a day late and a dollar short in updating a program that has long since been overtaken by the competition. Maybe so. There is nothing seriously wrong with *FlashCalc*; there just isn't anything very sexy about it. The program comes in *VisiCalc*'s standard format of 63 columns by 254 rows. It's neither particularly difficult nor particularly easy to learn, which is an improvement over its dear papa. The manual is the familiar black notebook. *FlashCalc* offers a few more financial functions than *VisiCalc*, and as far as I can tell, nothing important has been omitted. It runs on ProDOS, which is no big deal. (You can use *VisiCalc* templates, but you will have to translate them first; many people who bought Apple IIs before 1984 don't have the necessary systems disk.) The commands you employ are almost identical to *VisiCalc*'s.

The chief reason for considering *FlashCalc* is its price. At $99, it is probably as good as *VisiCalc* which costs $250, and it isn't that far behind the Advanced Version of *VisiCalc*, at a staggering (considering what you get) $400. *MultiPlan* is more powerful—but then its price is $195.

FlashCalc has a full array of mathematical, logical, logarithmic, and trigonometric functions. It falls a bit short on statistical analysis, omitting, for example, standard deviation (do you really need this?) and other sophisticated functions. It has more financial functions than its famous parent. These include future value of investments, either lump sums or periodic payments; internal rate of return; net present value; calculation of payment periods; calculation of payment amounts; and interest rate calculations. All these are executed by familiar commands which calculate the sum of the numbers in, for instance, cells A1 through A14.

FlashCalc's Replicate (copy) command is identical to *VisiCalc*'s, and is reasonably powerful. This is one of the most important commands on a spreadsheet, since it allows you to copy formulas from one cell while referring to values listed elsewhere in the spreadsheet.

Using *FlashCalc*'s financial formulas and replication, I was able to make a 225-cell compound interest table in about ten minutes. It took me about the same amount of time to make a similar chart showing the future value of one dollar a year at varying interest rates. This is competitive.

The program's formatting capabilities are an improvement over *VisiCalc*'s but still are limited. Column widths can be adjusted individually, but you cannot generate dollar signs or display numbers as percentages.

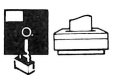
Paladin apparently still thinks the alphabet will suffice as a menu. Like its forebears, *FlashCalc* uses "/" commands. When you enter a command (such as /S for "Storage") you are presented with a string of letters across the top of the screen and must look them up, since no help screens are at your disposal.

The manual is marginally acceptable. A tutorial in the front gets you started quickly, and it is easy to find what you need in the reference section. The photos of screens, however, are shrunk down in size to the point of being indecipherable.

FlashCalc comes with one copy-protected program disk; you have to pay $10 for a backup. As if this weren't irritating enough, Paladin wants $50 for replacement disks if yours are damaged after the ninety-day warranty period!

All in all, *FlashCalc* is rather mediocre. As I mentioned at the beginning of this review, nothing is terribly wrong with it, but there's nothing special about it, either. Because of its reasonable price, though, you may want to consider it if you want a spreadsheet program for home or limited business use. (I would have given it an overall rating of "C" if it cost any more.)

On the other hand, if you're a new IIe or IIc owner and are looking for relatively inexpensive but moderately powerful programs, take a look at integrated packages like *AppleWorks* (retail price: $250). You will get comparable power at a lower cost than purchasing three separate programs, plus you'll have all the added advantages of an integrated software package.



MAGICALC

Artsci, Inc.
$99.95
48K; Apple II/IIe/IIc

Overall Rating	A	B+	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A	A	*Value for Money*

Magicalc is one of the best spreadsheet programs on the market. The program is better than *VisiCalc*, yet is half the price, and it is capable of using any standard *VisiCalc* file and model except those that contain trigonometric expressions (standard files, not *Advanced Version* files). The inability to use trigonometric functions is a small price to pay for a program that remedies many of the complaints heard about *VisiCalc*: 80-column display, entry of lowercase characters, individual column formatting, expanded report formatting, and use of *all* memory in the Apple—even that added with expansion cards (up to 512K).

Magicalc uses three enhancements: @ROW, @COL, and @ROUND. The first two return the absolute number of the row or column the cell is in. The column letters are converted to numbers, with A=1, B=2, and so forth. You may use the ROW/COL functions in calculations where months are converted to numbers as one example. The @ROUND function is very useful when dealing with multiplication and division in finances. Instead of coming up with fancy formulae [@INT9X+.5] to assure that rounding is correctly applied, this function will do it for you to whatever accuracy you desire.

Many of the major functions called by *Magicalc* are menu driven. This makes it easy to pick and choose the particular feature you want at the time. There's only one inconvenient menu feature: before printing you should reset the print format specifications, and you cannot do that directly from the print menu. Instead, you have to go back through the Main Menu, adding a half minute or so to your printing time.

Magicalc gives you the option of three display modes: normal 40-column mode, an 80-column mode (using one of several cards), and a 72-column mode (using the high resolution display). You can change from one configuration to another while running the program, although in some cases you may lose your model if you do (adequate warning is given). The 72-column display uses about 12K of model storage space and is difficult to read. I recommend using the 40 or 80-column mode. An 80-column display is handy for many models; it allows you to see most, if not all, of what you will be printing. I used a *Videx* board without inverse characters. With that configuration, the program will display 80-columns, but will not have a cursor to show you where the active cell is. You must rely on the display at the top of the spreadsheet—a bit inconvenient, but still useful.

All of the *VisiCalc* slash commands are present in *Magicalc*, and all work in the same manner, although there are exceptions. Let's dispense with the negative exception first. *VisiCalc* has one undocumented command (the /X command). It causes the current active cell, or some specified cell, to move to the upper left corner of the spreadsheet (the next time you start *VisiCalc*, try typing the following sequence of characters: /X>G35 and watch what happens). *Magicalc* responds

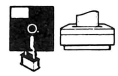
to /X and will move the cursor, but will not physically put the cell into the upper left corner. Any other cursor movement will cause the spreadsheet to jump to one cell away from that called for in the /X command (depending upon the direction you moved). There is also a sequence that displays one set of cells on the screen with entries going into a different set. On the positive side of the ledger, there are two major command enhancements: /Attributes and /L for individual column widths. The Attribute command lets you specify what kind of data will be allowed in the cell and if the cell is either protected or to be hidden on the display. Being able to hide cells is a nice display (and report) enhancement. You no longer have to move all of the intermediate calculations off to the side of your spreadsheets just to avoid having them print or show on the screen; simply "hide" them. Being able to change the width of individual columns is a long awaited display enhancement as well. It also helps when entering text. There will be fewer cases where you have to split words when the text is longer than global column width.

A few minor bugs were encountered when I pushed the limits of some of the commands. For example, each entry may be up to 229 characters long. When 229 characters were entered and then /E was used to edit the entry, the program hung and had to be rebooted (with consequent loss of the current model). Edit started working at 227 characters (but don't try to insert any beyond that and then re-edit). The second bug encountered involved insertion of columns in the area of the column BK. When I filled in the last rows of a spreadsheet and attempted to insert a row and cause entries to "fall off the end," the program generated an error and would not allow the insertion. Columns were another story. Not only could I drive entries off the worksheet by insertion of columns, but funny things happened to other columns, and, in one case, I got dumped from the program into the Apple monitor (again losing everything). These flaws will probably be corrected soon, and probably will never bother you. After all, when is the last time you filled all of the columns in a spreadsheet? Just be aware that the program sometimes does funny things when you exceed its limits, and save your work often.

The print command has been enhanced. You are still allowed to print to paper or disk, but with added formatting for left/right and top/bottom margins. All margins and setup strings are "remembered" from one printing to the next. Once set, all you have to do is specify the bottom right cell. *The Spreadsheet* will "print to disk" enabling the creation of command files and datagramming, as with *VisiCalc*.

The final enhancement involves the storage command. As you might have guessed, since *Magicalc* can handle models taking up to 512K of RAM, and the Apple disks hold something over 120K per disk, there must be some way to store and retrieve models that take more than one disk. There is: continuation files. When "disk full" error occurs on Save or an abnormal file termination is encountered on Load, the program lets you insert another disk and continue the process that was interrupted. If, on Save, you do not have a formatted disk handy, you have the opportunity to format one before continuing the save process. This continuation process is one of the most user-friendly features in the program. Other programs that use large data files should consider it.

The manual is complete and covers all topics well. There could be more figures as an aid, but most users should have no trouble with a bit of practice. The program is excellent and should be a strong contender to *VisiCalc*.



MULTIPLAN

Microsoft
$195.00
64K/128K (IIe); II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Multiplan is one of the most advanced electronic spreadsheet programs on the market. Along with many unique features, it has most of the functions from the granddaddy of spreadsheets, *VisiCalc*. The program comes on a boot disk and a system disk. (The boot disk I received was defective, and the replacement came in twenty-four days.) The system disk is not protected, so you may make as many copies of it as you need. You can only copy the boot disk once. *Multiplan* allows you to use either a standard 40-column display, or any of several 80-column cards. There is a utility on the boot disk for configuring the program to your particular system.

The documentation accompanying the program could be substantially improved; the writing style is difficult to understand. Part of the problem with the documentation may be due to the fact that *Multiplan* is available for many different computers, and the instructions for this version were not specific to the Apple II. For example, the manual refers to a Home key, a Cancel key, a Backspace, and a Tab key. The Apple has no keys with these labels. There are sections in the quick reference guide and in the on-line help that translate these into the actual Apple keystrokes, but it is confusing until you are able to remember the translations.

Multiplan is not a "total load" program. Each time you use it, you must insert the boot disk, remove it, and insert the system disk (which remains in Drive 1 thereafter). The system disk is frequently accessed while you use *Multiplan*. If you only have one disk drive, up to 75K of files may be stored on the system disk.

Multiplan offers a number of significant improvements over both regular *VisiCalc* and the "Advanced Version." The program will even read *VisiCalc* models and convert them to its own format. The conversion is not entirely automatic, but largely so. Fixing the few entries that do not automatically convert is easier than retyping the entire model.

The *Multiplan* worksheet is 63 columns by 255 rows. The display shows twenty rows and as many columns as possible, depending upon the widths of the columns and the type of display. At the bottom of the screen there are two lines that explain the commands, a message line, and a status line containing the current cell, its contents, the amount of storage space remaining, and the spreadsheet name.

Multiplan uses all the functions presently incorporated in *VisiCalc* except two—ArcCosine and ArcSine—and the manual provides the equivalent formulae for them. *Multiplan's* additional functions add significantly to its capabilities. COLUMN and ROW return the absolute number of the column or row the cell is in. DOLLAR, FIXED, and VALUE can give your spreadsheet a truly professional look. DOLLAR converts the number to text and presents it with a dollar sign in front, two decimals, and negatives shown in parentheses. FIXED converts the number to text with a specified number of decimal places, and VALUE converts text numbers back into numbers. LEN and MID also work with text: LEN returns the length of a specified text string and MID produces a specified number of characters from the middle of a text string. The final text function is REPT, which repeats a given text character or string a specified number of times. The REPT function may be used to set off an area of the spreadsheet or to produce bar graphs that extend beyond the limits of a single cell.

Two functions deal with the decimal portions of numbers: MOD and ROUND. MOD gives only the remainder of a division, and ROUND gives you a value rounded to a specified number of decimal places. SIGN returns a -1, 0, or +1 (depending on the sign of the specified number). Finally, standard deviation is preprogrammed as the function STDEV. This complements the other statistical function: AVERAGE.

A particularly useful characteristic of *Multiplan* is its ability to resolve forward references with iteration. In a forward reference, an intermediate value is calculated after it is needed. For example, if a spreadsheet without iteration is calculating by column, and column one contains a formula that is computed in column two, the value in column one will not be correct. With iteration, the spreadsheet would be calculated several times and the known forward references tested to see if they changed from one iteration to the next. Iteration stops when the change from one iteration to the next is small. The function DELTA specifies this test value and ITERCNT returns the current iteration number. There are interactions between ITERCNT and DELTA and the manual gives the necessary cautions for using them.

You can define eight windows in *Multiplan* and have any of them linked for scrolling, so you can produce a spreadsheet with instructions set off from the rest of the sheet.

The BLANK command works on groups of cells in addition to single cells. DELETE may be used on rows, columns, or a block of cells. However, when deleting a block of columns or rows in the middle of the spreadsheet use extreme caution: other cells next to or below the deleted block will move to fill the void. FORMAT gives you the option to change alignment or content format. Allowable alignments are center, left, right, or default; formats are default, continuous display (text will spill over to the next cell if too long), scientific notation, fixed-point, general, integer, dollar, bar graph, and percent. Numbers may be displayed with commas placed after every three digits, or the cell may display the formula instead of the result. Finally, individual column widths may be set. There is a Help command with an extensive series of Help texts. INSERT works in the opposite way that DELETE does, and the same cautions about partial insertion apply. Specified cells or only cells with formula may be made unavailable for data entry with the lock command.

Other useful *Multiplan* commands include: NAME, SORT, and EXTERNAL. NAME assigns a thirty-one-character name to a cell or group of cells. All future references to that cell or group of cells may be made by simply stating the name. The NAME command allows you to see a listing of defined names to that point. SORT does just what its name implies; rows or columns (full or partial) may be sorted in ascending or descending order. After sorting, if numbers and text are mixed, numbers, text, logical and error values, and blank cells are arranged as groups with the contents of the group arranged in the specified order. Standard ASCII order is used. Finally, the EXTERNAL command is used to link spreadsheets. The command operates in two modes. In one you are allowed to pull data from an inactive spreadsheet into the active one simply by giving the proper references to the data desired. The second mode creates a permanent link between two or more worksheets. With this link established, any time you load the worksheet that uses summary data from others, the required data is read and placed into its

proper location. This is extremely useful for accounting applications where dependent spreadsheets feed the income statement and balance sheet.

Printing with *Multiplan* is flexible. Output may be directed to either printer or disk (for later editing). Margins may be set for the output. Left and top margins, print width, print length, and page length may be specified (the maximum print width is 165 characters). The optional settings allow you to specify the area of the spreadsheet to print, print formula rather than values, put the row and column numbers on the output, and issue a printer setup string (the setup string is saved with the worksheet). As a bonus, you may specify print control characters for different areas of your report by embedding them in the spreadsheet (if your printer uses them).

Multiplan does not support the Software Arts Data Interchange Format (DIF). However, the program does have its own interchange format: SYLK (SYmbolic LinK). The manual presents a description of the format. At present, SYLK is not as widely used as DIF, primarily because DIF's EXTERNAL command can be used to better effect for transfer of data between spreadsheets.

With a 64K Apple II, you will only have 18K of memory available for worksheet space, which is only about half of the memory available with *VisiCalc* on the same hardware. According to the manual, if you have an Apple IIe with the extended memory, *Multiplan* uses the additional 64K to give you more worksheet space. In addition, the EXTERNAL COPY command, which allows you to bring in data from other files, partially offsets the relatively small amount of available memory. While there is software which interfaces *VisiCalc* with 128K memory cards such as the *Saturn*, *Legend*, and *Prometheus*, *Multiplan* may never have this luxury.

Unless you are locked into DIF files by your other software, or you need worksheets that are larger than 18K on your unmodified II, II+, or IIe, *Multiplan* is much more useful than *VisiCalc*.

Note: The version reviewed was the one that runs on the 6502 processor directly. There is a Z-80 version that is similar.

SENIOR ANALYST III

Apple Computer, Inc.
$225.00
128K; III

Overall Rating	B+	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	B+	B+	*Value for Money*

Like its predecessor, *Senior Analyst III* is a spreadsheet program with the advantage of allowing the consolidation of models as well as a single model spanning many disks. In addition, a print spooling capability allows you to continue working while printing out your reports. *Senior Analyst III* also provides a number of built-in functions, such as compound growth rate and linear regression forecasting, which facilitate calculations common in business.

The documentation consists of two manuals, one a tutorial and the other a reference manual. If you have not used *Senior Analyst*, you'll need to go through the tutorial. I went directly to the reference manual and became totally confused, but Business Solutions (the producer) makes it very clear on both the title page and the first page of the Table of Contents that you need the tutorial. The Tutorial Manual is extremely well-written and did not insult my intelligence as so many other introductory manuals have. The program has a fairly obvious command structure and provides reasonably clear error messages when you do something wrong. Although not quite as fast as better known programs, *Senior Analyst III* handles larger models and is easier to use. I'm just sorry that Business Solutions did not take fuller advantage of the Apple III's capabilities by providing interactive Help screens or split-screen viewing.

This excellent product is easy to use and very powerful, a serious contender if you need a modeling program. In addition, when you send in your registration card, you should receive the first issue of the *Senior Analyst Newsletter*.

THE SPREADSHEET Version 2.0

A.P.P.L.E.
$75.00
48K; II/IIe/IIc

Overall Rating	A	B+	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A	A	*Value for Money*

This is the exact same program as Artsci's *MagiCalc* (see that review). The only difference is the price. *The*

Spreadsheet, Version 2.0 is less expensive, but there's a catch—you must be a member of the A.P.P.L.E. user's group to purchase it (of course, that does give you a year's worth of the publication). It is available by mail order only. Call A.P.P.L.E. (Apple Puget Sound Library Exchange) at (206) 872-2245.

SUPERCALC²

Sorcim
$295.00
48K; II/II+/IIe; Z80 card

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Sorcim has succeeded admirably in keeping the software state of the art. First and foremost, *SuperCalc²*, which includes improvements to the original *SuperCalc*, is the premier spreadsheet package for the CP/M system. This edition introduces Date and Calendar Function Arithmetic, perfect for financial calculations requiring the time between dates and for spreadsheets used for project scheduling. In addition, all existing *SuperCalcs* are compatible with *SuperCalc²*, although the reverse is not true.

This version contains a Consolidations option which lets you add, subtract, multiply, or divide the whole or parts of any two or more sheets. The Arrange command lets you sort by columns or rows, on parts of the worksheet without disturbing titles, column footings, or other areas. A new Macro command facility lets you create command files that reduce repetitive keystroke combinations. Using its SuperData Interchange you can switch data between fields. It can communicate with BASIC and Pascal using the comma separated value format. With the SuperData format it converts files from *dBASE II*, the Visi-series, and other languages. *SuperCalc²* can change formulas as well as values if the receiving system can accept them.

New formatting features, rounding, scale factors, hidden areas, embedded commas, enhanced printing capabilities, and text-as-values are just some of the improvements that have been made on the old product. Unfortunately, CP/M does not support the inverse character set, which means that *SuperCalc²* highlights the cell being used. This conceals the full width of the number in the active cell, because, for example, the number 123.45 in an active cell looks like <123.4>. To view the full number, you must move the cursor.

The new manual contains full headings on each page denoting the topic, and illustrations for most of the detailed instructions. It consists of four parts: the User's Guide and Reference Manual; the SuperCalc² Installation Guide; the SuperData Interchange User's Guide and Reference Manual; and Ten Minutes to SuperCalc². The package also includes a quick reference card for *SuperCalc²*. The tutorial occupies six chapters of the first manual. Ten Minutes to SuperCalc² encourages the novice to build a first model quickly, illustrating the possibilities within the system.

The features of all other CP/M spreadsheets combined do not add up to the power and convenience of *SuperCalc²*. I highly recommend it.

VISICALC 3.3

Lotus
$100.00
48K; II/II+

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Let's assume you're in marketing and do financial modeling; or you're a businessman or accountant and need a quick accounting statement or cost analysis study considering the effects of variable interest rates; or you're an engineer who needs to do repetitive formula calculations. You need a spreadsheet, and *VisiCalc* may just be the tool for you. This program, which initially won an award as the single piece of software that most influenced the growth of the microcomputer industry, has been described as "*The* program worth buying a computer for." Of course, that was the distant past in microcomputer terms—about three years ago. While still a good program, *VisiCalc* now faces superior competition. In an effort to remain competitive, the price of *VisiCalc* was lowered in 1984 from $250 to $100. That makes this elder statesman of microcomputer modeling a good deal.

Briefly, *VisiCalc* is an electronic worksheet with up to 63 columns and 254 rows. Any position (called a cell) on the *VisiCalc* worksheet can be defined as a label, value, or formula. More importantly, any formula can relate to any other position or combination of positions on the sheet. Whenever any position's value changes, all other items that depend on that value change automatically, without further action on the user's part. For example, say you want to show an increase in sales of 10% per month in your business forecast. You put the sales value of the first month at, say, position B1, and

simply define the new month's sales at position C1 as "B1 * 1.1." The C1 value for the second month's sales is instantly calculated using the equation and the data in B1. You may carry on projections through the rest of the year, using constant or variable values.

Of course, this is a very simplified example of what a spreadsheet can do. Given the right equations, you can use a spreadsheet to do almost any sort of number crunching, from figuring your taxes to forecasting the return on your investments.

VisiCalc's editing commands, such as Replicate, enable you easily to create rows and columns of repetitious values or formulas, even if each calculation is related to the previous formulas in preceding rows or columns. That means you don't have to retype the "B1*1.1" from the earlier example over and over. Other editing commands erase cells, rows, and columns, and allow you to edit formulas without bothering to retype them from scratch. And you can easily move the cursor around the screen with the standard keyboard commands.

VisiCalc features a complete set of arithmetic operations (addition, subtraction, multiplication, and division) and exponentiation; financial functions, such as Net Present Value, Sum, Average, Minimum, and Maximum; and trigonometric and logarithmic functions. In addition, the "Lookup" command allows the comparison of a value to the successive values in a given range, and returns the corresponding value from the column or row immediately to the right or below the entries in that range.

Other commands allow you to fix titles on the screen while the rest of the spreadsheet scrolls, or split the screen in sections. This split screen effect allows you to display separate portions of the table at the same time, even if they are many rows and columns apart. Values can be formatted in dollars and cents, scientific, or interger numbers, and flushed right or left or centered.

You can save files to disk for later retrieval. You can also store them as formulas for the calculations on the worksheet, or in Data Interchange Format (DIF) files. Files stored in data interchange format can be used by many other programs, including spreadsheets, spreadsheet templates, and file and database managers. *VisiCalc* also features full compatibility with most line printers. The system allows commands that suppress or add line feeds and adjust the column width. You decide which section of the worksheet you want to print, place the cursor at the top left cell, indicate the bottom right cell of the appropriate block, and command the program to print. Large worksheets, of course, have to be printed in paper-size sections. Either the calculations or the formulas can be sent to the line printer. A 132-column printer is better for a spreadsheet since it allows you to print more columns across on one sheet.

VisiCalc can generate low resolution graphics based on the information in your spreadsheet. In addition there are many separate programs designed to run with *VisiCalc* that produce excellent graphics. There are also such "companion" programs which provide the formulas for a given task, such as tax planning. If you think you'd like to use a spreadsheet for a specialized purpose, but don't even know how to begin designing the formulas for it, look in the Modeling Utilities section of this book for reviews for some financial templates.

The documentation is excellent. The manual contains a good tutorial, even if you have absolutely no experience in programming. It takes between one and two hours to master. Its four lessons offer many practical examples and illustrations. The 144-page command reference section offers very good explanations. Illustrations of the screen help clarify even the complex points of spreadsheet manipulation. Best of all, Software Arts includes a superbly organized chart of all the commands, and a handy foldout reference chart that can keep you by your computer while you work.

VisiCalc is a versatile product applicable to a wide variety of uses and users. While it isn't the newest program in the modeling field, it isn't to be discounted because of its age. Many retail stores have an excellent demo of *VisiCalc*. Check it out.

VISICALC for the IIe

Lotus
$250.00
64K; IIe

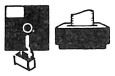
Overall Rating	B-	A	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	A	B	*Value for Money*

The Apple IIe *VisiCalc* is the same old *VisiCalc* with a few additions which allow you to take advantage of the IIe's features. It recognizes the up and down arrow keys, the Delete key, the 80-column card and its lowercase features, including the extra 64K, if available.

There is one major problem. First, let me quote the manual: "Within memory limitations, any existing Apple II *VisiCalc* worksheet will run with the Apple IIe *VisiCalc* program. The Apple IIe *VisiCalc* program is compatible with the Apple Super Serial Card and the Apple Parallel Interface Card. The Apple IIe *VisiCalc* program supports any printer that was supported by the Apple II or Apple II Plus *VisiCalc* programs."

I had *VisiCalc* for my II+ and used an Apple parallel interface card with an Apple dot matrix printer. I have the same card and printer attached to my IIe. Some-

times it prints properly; other times it ignores commands to compress the print or suppress the line feed. The unpredictability is a major frustraation. My dealer contacted VisiCorp many times on my behalf. They said, in effect, that I am not capable of operating the program. For about three months, they had the dealer convinced they were right until the latter finally got a IIe, interface, and a printer in stock at the same time. He had the same problems, as did another friend with a IIe with the same equipment. But we all know what happened to VisiCorp. We'll have to wait and see how well Lotus supports this product. The relatively low marks for Ease of Use and Value for Money result from a comparison to *MagiCalc*.



Spreadsheet Utilities

MERGECALC

Micro-Decision Systems
$125.00
48K; II/II+/IIe/IIc; *VisiCalc* required

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	B-	*Value for Money*

MergeCalc allows you to operate with multiple *VisiCalc* files, or two DIF files in order to combine them into a single file. Using *VisiCalc* files, the logic is maintained when formulae, instead of values, are present. Using DIF files, calculations are performed on values alone. (The updated version excludes rows, columns, or cells.)

The calculations which merge files may be quite complex to include all of the standard mathematical functions (addition, subtraction, multiplication, division, and exponentiation). Files may be combined with files or with some constant value.

The simplest example of a use for this program is the addition of four quarterly reports in order to obtain the yearly summary report. Other uses are limited only by your imagination. Up to fifteen files may be combined in one pass, and, of course, this combined file may then be combined with others if necessary.

Of course, very interesting results can be obtained if the files operated on are not compatible in form; even this is acceptable if you know what you are doing. A nice feature is the time estimate provided by the program to do the job requested.

Finally, if you have a great deal of *VisiCalc* file combining to do, this could be a very useful program to you.

REAL ESTATE MODELS FOR THE EIGHTIES

Commercial Software Systems, Inc.
$89.00
128K/192K/256K; II+/IIe/IIc/III; *VisiCalc* required

Overall Rating	B+	C	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A-	B	*Value for Money*

Real Estate Models for the Eighties is a set of spreadsheet models for real estate professionals. In fact, the manual says, "If you do not know how these computations are done with calculator and paper and what constitutes a reasonable answer, you probably should not be using this package." That's a fairly tall order: some of the models are monsters.

Because of the size of the spreadsheets, you'll need at least 128K of RAM, and in some cases more. The package runs with *VisiCalc*, *Advanced VisiCalc*, or *FlashCalc* on the Apple+, IIe, IIc, and III. *VisiCalc* and *FlashCalc* require 128K on all machines. *Advanced VisiCalc* requires 192K on the IIe and 256K on the III. The manual says *Real Estate Models* may run with some other spreadsheet programs, although it does not say which ones. It will not run with *Appleworks*.

Real Estate Models includes sixteen spreadsheet templates for analyzing amortization, depreciation, wraparound mortgages, cash flow and return on equity, mortgage assumptions, shared equity appreciation, variable rate mortgages, growing equity mortgages, loan buydowns, and more.

Most of the models are elegantly simple and excellent. However, in a couple of cases—particularly the model for cash flow and return on equity—Commercial Software System's reach exceeds its grasp. Using *FlashCalc* with a 128K IIe, I didn't have enough memory to load the cash flow model. Greg Glazner, author of the program, says it was developed with *FlashCalc* on a IIe, and that the model should fit with 1K to spare. He sent an updated replacement disk, but the model was still too large. (*FlashCalc* will support up to 512K of RAM, but then you're talking about a significant additional expense for a RAM upgrade.)

You should make sure that all of the models will fit on your system before buying the package. The cash flow model is by far the largest.

Because of the memory shortage, the cash flow model did not work properly. Also, it took about 2½ minutes to load and about forty-five seconds to recalculate. (Never mind that the tail end of the spreadsheet was missing.) Further, *FlashCalc* scrolls awkwardly when memory is taxed, making it difficult to move around in the spreadsheet. You would probably want to print results rather than reviewing them on the screen. In all, this spreadsheet strikes me as too cumbersome to use very often, even if it would fit into the computer.

Despite the professionals-only warning, the manual is very good—in fact, it would be outstanding if it were not for a few failures in attention to detail. It is probably true that you can get yourself into trouble with *Real Estate Models* if you don't understand how the calculations work. Nevertheless, the manual explains the concepts clearly and succinctly—a much wanted improvement over manuals (including *FlashCalc's*) that tell you how to run a program, but don't tell you how to use it.

The manual's flaws are mostly in the nuisance category: the page numbers are wrong in the table of contents, the models are not arranged in the same order as they are on the disk, the sample spreadsheets are printed in type so small as to be barely legible.

With the exception of the cash flow spreadsheet, *Real Estate Models* works quite well. And since it is spreadsheet-based, you can customize the models—provided you're up to it technically. That, along with the $89 price, makes *Real Estate Models* worth considering.

However, I have to ask whether a 128K IIe is really enough computer (and whether *FlachCalc* or *VisiCalc* are enough spreadsheet) if you routinely crunch numbers on this scale. Real estate professionals who make these kinds of calculations daily might consider investing in a more powerful computer and/or a full-fledged real estate program. For those who make such calculations less frequently, *Real Estate Models* may be the solution.

TAXCALC

TaxCalc, Inc.
$150.00
48K; II/II+/IIe/III; *VisiCalc* required

Overall Rating	B-	B	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	D+	C	*Value for Money*

This *VisiCalc* template requires *VisiCalc* or *III E-Z Pieces* to operate. It probably won't help you if you're looking for a tax preparation tool, because it targets the professional accountant or tax attorney, i.e., someone well acquainted with tax laws and tax preparation. It provides a simplified format for tax planning if you have the proper background. However, I am not an accountant, so I can't testify to that. Until I opened the package, I didn't realize that you need pretty extensive familiarity with tax laws and *VisiCalc*. I've used *VisiCalc*, but I found *TaxCalc* a bit difficult to use. I thought the layout rather cramped and I frequently found myself in the wrong row or column. *VisiCalc* doesn't have good error handling and this template isn't any better. In short, if you're comfortable with *VisiCalc*, you'll find *TaxCalc* easy-to-use. If not, I'd advise a different tax planning tool.

The updated, but still sparse documentation consists of twelve short pages. Although better written than the original, it does not provide enough detail for people who do not already possess thorough knowledge of the tax laws and spreadsheets. The main point covered in the manual is that you should use the program with a form 1040 beside you and that you should know how to use your spreadsheet program. You get one example, no tabs, no tutorial, no glossary, and no description of how to use *TaxCalc*.

At $150, I think the price a little high, especially since updates of the tax tables cost $50 per year (which seems reasonable). Certainly, a little better documentation is called for at that price, if nothing else. I also think that the package should make clear that *TaxCalc* is not meant for the nonprofessional.

VERSAFORM LEGAL OFFICE MANAGER

Applied Software Technology
$400.00 (alone)
$469.00 (with *VersaForm*)
64K; Apple II/II+/IIe/IIc;
VersaForm required

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

This is a template for use only with *VersaForm*. Three disks contain a basic record format, three different client bills, and monthly report and scheduling formats, all designed specifically for a law firm. You simply transfer these formats to a data disk and then use the *VersaForm* program to enter information and print out reports. The system stores information for any number of attorneys or clients. Usually one disk is assigned to each attorney. The system is ready to use "as is" or can be customized to suit your specific needs. For instance, automatic checking and filing can be specified so that when the manager enters an attorney's initials, that attorney's hourly billing rate is automatically placed in the correct field and the intials are checked against a list.

The system works like this. The office manager enters the information from a new case file onto a record. The record has space for the file name; the file number (which becomes the key by which the record can later be located); the client's name, address, and other personal information; the attorney's initials; the case type; and other coded information which later produces specific reports. Then the manager enters the date, a description of the action performed (such as a court appearance or client interview), the number of hours, and the rate, if necessary. As explained above, the system can automatically fill in some of this information. The system then adds up the fees and costs, subtracts the client's payments, and prints out a balance due. It also keeps a running total of the hours spent on the case and the total cost. At the touch of a couple of keys, it prints out a bill on the office letterhead. You can also program the billing to occur automatically once a month. Nothing could be simpler.

Six management reports are provided. Three give information on accounts receivable by attorney, by case, and by age of the receivable. Other reports detail the hours and fees recorded and generated by each attorney, and one prints an index by file name so that you can look up the file number quickly. These reports are printed out 132 columns across. You can send a code to the printer to set up compressed mode if available. The system will support a hard disk, and instructions for setting it up are provided in the excellent documentation. In addition, you can easily create new reports. For instance, one firm may want to know how many low-fee or criminal cases it is carrying. The program leads you step-by-step through the creation of a new report. A scheduling system permits you to produce schedules for each attorney or for the whole office. The information is entered on a simple form and reports printed out on a daily or weekly basis. The system provides sample attorney interview and time sheets which can be used to feed required information to the program.

The manual is clear and easy to use, leading you through the steps of entering information, selecting and printing out reports, and customizing the system. It provides instructions on daily procedures, weekly and monthly housekeeping duties, and backing up disks. It assumes no prior computer experience and is very well written.

The program ran perfectly and was quite easy to learn. A prospective buyer should be aware that he or she could create these templates using *VersaForm* alone. It would take time, however. Like templates for other programs, such as *VisiCalc*, this program saves time and effort, especially for the computer novice or the business person who just wants a turnkey operation. In this case, for about $500, a law firm has an easy-to-use and efficient billing system which provides useful and rather sophisticated management reports. In addition, it will have the separate *VersaForm* program, which has a wide range of uses.

VISICALC FORMATTING AIDS 4.7

Data Security Concepts
$54.95
48K; II/II+/IIe/IIc/III in emulation mode;
VisiCalc required

Overall Rating	A-	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	A	*Value for Money*

VisiCalc Formatting Aids (formerly *Visicaids*) for the Apple II+ and IIe gives you access to report features normally not available with *VisiCalc* (and, reportedly, *MagiCalc* and *Call-A.P.P.L.E.'s Spreadsheet 2.0)*. It deserves serious consideration from people looking for a cost-effective means of overcoming many of *VisiCalc*'s shortcomings.

Using text files created by *VisiCalc* (not DIF files), this program permits you to take control of your reports in new and powerful ways. Possibilities include printing of variable width columns or selected columns

and rows, automatic comma insertion in large numerals, local or global floating $ signs, centered report headings, automatic multiple copies, and a formula reader. Because original *VisiCalc* files cannot be altered with this program, they are protected from accidental changes.

The initial booting requires you to configure the program to your system and, if you own a IIe, gives you additional information not contained in the documentation. All subsequent start-ups take you directly to the Main Menu where you can opt for the Label Splitter (divided long label columns into two or more shorter ones), the Formula Reader (not flashy, but adequate), Print File Reader (displays *VisiCalc* created print files), or Variable Width Reader (for variable width columns in reports).

In this latest version, the column divider option now allows option to suppress the divider between specified columns. Column width specifications can be repeated for successive columns simply by pressing the Return key. Different formats can be called without having to re-enter the file name. This version is up to 25 percent faster than previous versions, and includes a sample file with formulas used to produce decimal alignment other than 100ths.

The documentation is complete, with an excellent tutorial. The program is not copy-protected and Data Security Concepts provides registered owners with periodic update information and an opportunity to obtain new versions of the program for $7.50.

This program can be a real boon to experienced owners of the original *VisiCalc* who have become frustrated by its inflexibility in report generation.

VIZ-A-CON

Abacus Associates
$99.95
48K; II/II+/IIe/IIc/III; *VisiCalc* required

Overall Rating	B	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	C+	A	*Value for Money*

Quite simple in concept, *Viz-a-Con* takes two *VisiCalc* worksheets of identical structure but different numeric entries and adds them together. The program literally adds the contents of a cell on spreadsheet X to the same cell on spreadsheet Y and writes them to a new blank spreadsheet, Z, of the same structure as the first two.

Two applications are obvious. In an organization with two branches with similar functions reporting to the same boss, you can add the results to get a composite. Moreover, the program can add similar monthly results for the same branch to yield a cumulative year-to-date spreadsheet.

Using the program proves a little cumbersome initially, primarily because the documentation is better suited to an intermediate rather than a first-time user. The documentation, although complete and step-by-step, makes the process seem unnecessarily complex. The addition of a page containing a visual model or overview of what the program does would help the beginner enormously. Basically, you make copies of blank (headings only) and full versions of your worksheets in both DIF and *VisiCalc* formats. You then consolidate the two (or up to fifty) spreadsheets simply by answering the *Viz-a-Con* questions. You can then save the process and use it again next month rather than going through the same manual steps again. For subsequent similar consolidations you can add to or delete from the process.

Copying takes a long time, but the alternative calls for you to build a huge worksheet with custom cells for each application.

This extremely useful (and copyable) spreadsheet utility works with *VisiCalc*, *MagiCalc*, and *The Spreadsheet 2.0*. Other versions are available for other spreadsheets and other computers. *Viz-a-Con* is indispensible for people who need to consolidate spreadsheets.

Scheduling

PROJECT PLANNER

Applitech Software, Inc.
$195.00
64K; Apple II+/IIe/IIc; 80-column card optional

Overall Rating	A	A-	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

Project Planner is a versatile, powerful, and sophisticated project development tool. People engaged in any type of large-scale project planning will find it a most useful means of examining project flow and predicting deadlines. Based on the Critical Path Method (CPM) of project analysis, *Project Planner* can help you predict completion dates, determine critical activities, and suggest project flow. This method demands projects with a distinct beginning and a distinct end, not a continuous process. Moreover, each step must depend on the completion of one or more previous steps.

Project Planner is now offered as two products in one: a new 128K version and an enhanced 64K version. Both versions support several additional printers in graphics mode. The 128K version, however, expands the capabilities of *Project Planner*, offering new features not available on the 64K version.

The 128K version can handle larger projects with more activities and parallel paths, display activity names on the Project Graph or PERT chart and print sideways or horizontal, regular or mural size flowcharts. The calendar has also been improved, allowing the user to indicate not only the number of days worked per week, but precisely which days are working days for the project and which ones are not (e.g. you work on a project only Tuesdays and Thursdays).

This Pascal-based program is one of the easiest to use of its type. It includes two program disks and a tutorial disk. The first program disk, a Pascal boot disk, checks drive two for the presence of a formatted data disk. It automatically formats blank disks to receive data. You then insert the Project Planner disk into the first drive.

The fully menu-driven program prompts you to start a new project or load existing data. When you start a new project, you first see a data input screen that asks you to list the activities in the project and their duration. Following this, you specify the order of precedence for each activity. This allows you to enter activities in any order. Data entry is quite easy and well protected against errors. Should you accidentally exit this area of the program, you see a prompt asking you if you really meant to leave. When you decide to load existing data, you see a catalog of available files. Again, you return to an enhanced master menu.

Once you have entered data, you see the initial choices of new project or load existing data, plus three additional options. These include a project graph or flow chart, a report printing option, and the chance to update or correct data in the current project. (The program requires an Epson or compatible printer, a Silentype, or a printer that uses the PAKSO or Grappler interface.)

The project graph option allows you to view a high resolution graph of the project flow chart as produced by the computer from your activity, duration, and precedence lists. The "critical path" (those activities that must be completed on time for the project to be completed on time) appear in red while the slack time activities appear in a contrasting color. You can change the chart scale to look at the entire chart at one time, or expand it to examine small sections in detail. You can print the chart if you wish. You can also change the duration of any activity and play a "what if" game with the project flow (useful in reevaluating a project underway).

To print a report, you enter the real time starting date and time frame. The program produces a complete list of each activity with its starting and completion date. Along with this list, you get a table showing the earliest possible date for completion of each activity as well as the latest date you can complete an activity and still complete the project on time. A chart notes the critical activities and the slack time activities. You can also print out a list of definitions with the various tables (useful when preparing presentations for large groups or for bid purposes). Many other areas of the program let you print trial copies of the data for editing.

The update option has a number of uses. You can

correct errors made during data entry, add or delete activities, change the order of precedence of activities, and change activity names and durations. You can then save the changes as a new file if you wish.

I found all screen prompts and displays exceptionally clear and easily understood. You need to read the manual only if you don't know much about the critical path method of analysis; otherwise, the program is virtually self-explanatory. You can use the Escape key to recover from any error in menu selection. All directions use plain English. The user's manual is a credit to clear writing and illustration. A comprehensive table of contents and index make for easy use. The approximately seventy pages divide into three chapters, followed by appendices. An introductory chapter gives you a fundamental background in the critical path method of project planning and its requirements. The tutorial disk accompanies the second chapter to illustrate each of the available options and the CPM process. It covers much of the same material as the manual and makes mastery of this package fast and painless. The second chapter also gives detailed directions for using the five main menu options, with screen displays and examples of data. The third chapter, a reference area, provides a brief summary of the major options along with more examples and illustrations. The appendices deal with the system setup, the filter (an important aspect of CPM), the basic of CPM theory, and some suggested uses. The glossary provides several pages of terms and definitions useful for people not acquainted with critical path planning. A quick reference card helps when you have become somewhat familiar with the program.

Many other features make this program a real value. The package supports a variety of 80-column cards for the Apple II+, IIe, and IIc, plus a variety of printers and graphic interfaces. You can easily configure your existing equipment for graphics printing. The filter, a powerful tool yet user transparent, helps prevent errors. The filter traps those events that lack predecessors or successors, or automatically eliminates continuous loops. The "what if" feature allows you to examine a number of different circumstances. You can copy the startup disk using the Apple system COPYA program or ProDOS. You can also copy the data disks, but not the program disk. Registered users can obtain a backup copy for $20.

I have found only one major fault with the program. Under certain conditions, you can crash the system into the Pascal system prompts. You can restart the program only by rebooting and sometimes must turn the computer off and then on again to gain control. You will most certainly lose data in this type of crash. Why not have a reset disable? The otherwise excellent manual doesn't address this problem.

I thought *Project Planner* a most useful tool for engineers, researchers, consultants, contractors, research and development personnel, and others. It can help you make planning and projects more time efficient. The ease of playing "what if" games, the flow charts, and the printed output give your presentations more impact and foster more effective communication. The package incorporated sophisticated but flexible organizational features, yet with all its power and versatility, it's very simple and easy to use.

TARGET PLANNER

Advanced Management Strategies, Inc.
$225.00
48K; II/II+/IIe/IIc

Overall Rating	B	B+	*Reliability*
Ease of Use	C+	B-	*Error Handling*
Documentation	B	B-	*Value for Money*

Target Planner falls into the same category of business planning programs as *Desktop Plan* and *VisiCalc*. Like the others, the program takes data and formulas and combines them according to set rules to obtain output. As the planner, you may then change the input parameters and recalculate the model to observe any changes.

Target Planner most closely resembles *Desktop Plan II* (please see that review), being very similar in execution. Differences lie in the ease of performance of certain operations, particularly data entry and speed of execution. In general, *Desktop Plan II* has the better data entry format because you enter data directly into the planning form. With *Target Planner*, you must create a program with your formulas and data entered in the correct locations. At times this program becomes rather complicated. Identifying a particular piece of data in the middle of the program may prove difficult, especially if you are trying to change one number in the middle of a string. However, *Target Planner* outshines *Desktop Plan II* in the entering of calculation rules. Because you actually write a program, the formulas and all connecting logic are laid out in front of you for easy modification. This is of particular value when you have rather complicated formulas involving logic. With the other program, you must alter the program itself to obtain these logical operations. With this program, you have only to insert them into the flow that you have created to perform the necessary calculations. The necessary programs are not difficult to create. *Target Planner* includes step-by-step instructions.

The documentation supplied, although quite complete, requires rereading of some sections for thorough

understanding. Your best bet is to follow along with the computer and do the examples as they appear in order to get a feel for the program. Be wary of the examples, however, as some include typos that could lead you astray.

Target Planner will not run with just one disk drive. The program also has a quirk peculiar to the Apple II configuration—it only displays forty characters on the screen at a time, even with an 80-column board. You can change the basic configuration of the model you create (within limits). You can add or delete columns from the end of the model only, but you can add or delete rows anywhere in the model.

When creating the model, you can switch the display from the program to a spreadsheet showing the results. Only the format appears; calculations come later. This is useful, but the part of the model displayed on one screen may not correspond with the spreadsheet on the other screen. You may have to line them up. I found this tedious.

You must also exercise some care in using *Target Planner* for large numbers. The program performs calculations using up to seven significant digits only. It really is not meant for engineering calculations and models, only financial or related models. Note also that when using conditional statements in your program, conditions which appear true may sometimes fail. This comes about through rounding off and you should take it into consideration when dealing with very small numbers.

VISISCHEDULE

Paladin
$149.00
48K; II/II+

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B+	*Value for Money*

With *VisiSchedule* you are able to perform complex project planning in a relatively straightforward manner. Project line items are entered with their characteristics (cost, duration, prerequisites, etc). The program then calculates and displays the corresponding schedule with associated resource allocations.

The program, running on an Apple with 48K, can handle up to 50 line items. The Language card (or 16K card) adds capability up to a total of 160 line items. This is one case where the additional hardware is extremely helpful.

VisiSchedule uses the Critical Path Method (CPM) as its technique for analysis, as opposed to PERT (Program Analysis and Review Technique). The CPM abbreviation will be used in this review, and should not be confused with the CP/M operating system (which this program does not use). CPM is a more visual technique which produces schedule charts. PERT treats a series of events using probability to estimate expected time required to do the job and is, in this reviewer's opinion, hard to use. CPM, on the other hand, treats activity durations and definitions as fixed, and then determines where the critical path is and where slack time may be. If one variable is changed, the entire schedule will be recalculated.

The program comes with a program disk and an example disk. A backup is available for the program disk (for $20). In order to obtain it you must send in the program registration form with the money. The program disk is copy protected.

The original program was written in Pascal, but neither the Language Card nor the Pascal operating system disks are necessary. There is no source code, only the machine language implementation.

Program loading is straightforward: simply boot the program disk with a data disk in drive two. The Apple must be configured to support Pascal operation or some of the features will not work. This means that the boot disk must be in slot six and the printer must be in slot one. You may have cards in other slots, but the system will not use or recognize them. The standard 40-column screen is used even if you have an 80-column terminal card. There is a list of printers and a printer card that the program has been tested against in Appendix A of the documentation. Of particular note is that *VisiSchedule* will not work with the Mountain hardware CPS card, the California Computer Systems parallel (7728) card, or the SSM AIO parallel card at all. There is another unworkable combination: the NEC Spinwriter 5520 with the SSM AIO serial card. One other configuration that will not work is the D.C. Hayes modem in slot three. The program will not boot in this configuration. If you have any questions, be certain to ask your dealer, or write/call Paladin.

The program uses the standard Visi-type menu where the arrow keys and spacebar move the cursor and the return key selects the function. This is an excellent method of selection, and other programs could learn from the example.

On boot-up, *VisiSchedule* will ask you if some basic information is correct. You'll likely have to change the date, but that is all. Dates may be entered as MM/DD/YY or DD/MM/YY, at your choice. You are also allowed to enter relative dates in the form of +60D or -5W, which will add 60 days or subtract five weeks in this example. You may also manipulate months and years in this manner.

In the schedules, *VisiSchedule* will handle up to 999

time units between the period 1/1/1977 through 12/31/2065, and recognize leap years. Unfortunately, the program will only schedule on a daily or weekly basis. You cannot program a schedule where all tasks are measured in units of months or years, so long term schedules are impractical when using *VisiSchedule*. This is not a serious limitation, but should be kept in mind before buying the program since your application may depend on long term scheduling.

From the main menu you are allowed to: load a program from disk, modify or create a program in memory, clear the memory, delete files from the disk, format a disk (this requires Pascal format for data disks, DOS will not work), save the schedule in memory to disk, print the schedule, change the data disk drive (from two to six disks supported), and write to DOS (but more on that later). All functions appear to work smoothly, with adequate error trapping and recovery.

As you move into actual project scheduling you will be given options to change descriptive information, and then be led into the menu, which allows you to establish the baseline for the task. This menu covers the descriptive information such as units for the various cost tracking. As a side note here, be aware that *VisiSchedule* will only handle numbers of four non-negative integer digits; so be aware that you set the units correctly (dollars, thousands of dollars, etc.).

When setting up, you can also change one, or all nine of the manpower skills which may be associated with your project. In addition, you may set your normal workweek and holidays you expect to observe. Up to 24 days may be specified as holidays.

A full range of graphic displays designate the various jobs, such as the following examples:

>++++++++++> A critical job (one that affects the entire project).

>— — — — —> A non-critical job (one with slack time).

>:::::::::::> A completed job.

Since the display is only 40 columns wide, there are several techniques the program uses to allow you to view the schedule. By hitting CTRL-A, the screen shifts over 40 columns, so you really have 80 columns easily available. For schedules over 80 characters long there are scroll commands which allow you to shift the schedule by an amount and direction that you specify. Displays of the manpower and direct cost figures are also available, as well as displays of a line's prerequisite and successor information.

Of course, you may modify the schedule once the data is entered. Particular lines may be moved or changed in their characteristics, and lines may be inserted and deleted as required.

Once data is entered, various manipulation techniques are available: from simple renumbering of the tasks, through sorting, to more complicated techniques of analysis, which level manpower across the schedule.

It is also possible, when marking task completion, to mark partial completion and have the program rescheduled. This turns out to be extremely handy as the program progresses, and Murphy's Law starts to apply itself. You have an instant recalculation of the schedule to show the effect of anything not happening according to plan.

VisiSchedule supports DIF file transfer. Of course, since the program was written in Pascal and not under DOS, the process is not quite as simple as it otherwise could be.

First, realize that the schedule information is not placed into the DIF file; only the manpower and cost data will be transferred. In simple terms, what you have to do is first create a data file from the program. Then you enter the option called WRITEDOS. After several disk swaps between your *VisiSchedule* data disk and an initiated DOS disk, the DIF file is created for entry into any of the other Visi- programs such as *VisiCalc* for analysis, *VisiFile* for data management, and/or *VisiPlot/VisiTrend*, for statistical analysis and display. Of course, there is no provision to transfer data back to *VisiSchedule*. Appendix B in the manual has further data on transfer to other programs.

The program has an excellent error trapping routine with descriptive error messages. The backup policy does leave something to be desired. Paying $20 for a duplicate program disk (and only one is allowed) is stiff; especially considering the habit of Pascal to access the disk quite often when compared with DOS, or other assembly language programs.

VisiSchedule is a good program with many applications. It is generally well written and flexible enough for most applications; although the lack of long term scheduling may be a handicap for some.

Statistics

AIDA

Action Research—Northwest
$235.00
48K; Apple II/II+/IIe/IIc/III

Overall Rating	B-	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	D+	C	*Value for Money*

AIDA is a general purpose statistical package with graphics support. It includes statistics commonly used in the social sciences, from basic means, standard deviations, and ranges through Chi Square, Rho, and one-way Anova to multiple regression. Data entry is flexible and easy. The program reads Apple data files directly in cases where they are the best data source rather than asking you to reenter data. Overall, it offers some very interesting possibilities for interactive data analysis. The program prompts for the required commands, variable identifications, and running options, and almost anyone experienced in statistical analysis can use it readily. However, the publisher made no attempt to provide a tutorial either for the program or for the statistical applications possible using it. The manual, although comprehensive, is poorly organized and very difficult for a beginner to use. It works best as a reference. Users unfamiliar with statistics will find it nearly impossible to make sense out of the program without help.

AIDA's data handling capacity and configuration are unusually large and flexible. Three to four thousand data points, the standard capacity with this program, expand to as many as twelve thousand points by foregoing graphics capability and expanding memory to 64K. You save data onto a standard Apple DOS 3.3 configured disk, one variable per file, in case entry sequence. You need not load data in advance; the system retrieves it variable by variable, as needed. Data retrieval is nearly automatic with two disk drives; with one disk drive, frequent changes of program and data disks make it more convenient to load data in advance. The main advantage of this database structure lies in your ability to store on disk data far in excess of what you could store in active memory. When you exceed active storage capacity, the program automatically purges unprotected variables to make way for newly activated ones. Data capacity and system efficiency results in part from treating all data in an integer mode and converting to decimal form for output. This limits significance to four decimal places, which does not matter for most data in the social sciences.

AIDA also possesses unusual flexibility in manipulating, transforming, and displaying data. Variable by variable relationships displayed both graphically and otherwise supplement a statistical index of relationships between variables. You can easily transform variables using any mathematical function or arbitrary intervals. The Means command (one-way Anova) displays means on data grouped on any variable. The program permits you to explore what is happening within the data after identifying statistical significance.

The multiple regression subroutine permits analysis of one dependent and up to twelve independent variables at once. You can obtain step-wise analysis manually, choosing the steps yourself. Comprehensive statistical tables accompany analyses, as do significance levels. The program also handles missing data elegantly and simply.

AIDA permits user subroutines, and you can print output into text file form for further refinement with word processing systems that work with standard Apple text files. Only sophisticated users will employ this ability, however. Supplemental modules could build the program into a truly impressive statistical tool, and with a well-written manual, it could help university students doing research. At present, however, *AIDA* requires extensive supplemental tutoring for academic use. As is, it represents an excellent start toward a comprehensive interactive data analysis system.

ANOVA II

Human Systems Dynamics
$150.00
48K; II+/IIe/IIc

Overall Rating	A-	A-	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B+	*Value for Money*

ANOVA II performs a complete analysis of variance for both simple and complex research designs. The program will accommodate one to five factors and two to thirty-six levels per factor, for a maximum of 120 treatment combinations and a maximum sample size of 100 subjects (or data points) per treatment combination. The program will generate descriptive statistics and an analysis of variance summary tables for each cell of the design. The design may be completely randomized, between-within, or a repeated measures/randomized blocks design. An analysis of co-variance program is also included, although only one co-variant may be defined at a time for each analysis. An advantage of this program is that it allows both equal and unequal sample sizes to be analyzed.

Graphic representation of the data is displayed on the monitor screen. Although the program does not include the capability to print out these graphs, it does allow the information to be saved in a binary file so that it may be later accessed by a graphics dump routine program and printed out. Human Systems Dynamics recommends a program such as the GRAFPAK from SmartWare (which can be purchased through Human Systems Dynamics at a discounted price) or THE GRAPPLER card from Orange Micro.

The program assumes that you are familiar with the computer and have a fairly sophisticated knowledge of DOS jargon, file structures, and Applesoft error messages. Those who are less sophisticated with the computer can learn to use this program, but it is not for the novice.

A minor annoyance of the program is that error messages are represented by their code number only, and there is no explanation of what the error numbers represent. Thus, you will need a DOS reference manual which includes the DOS error codes.

A warning: some of the earlier *ANOVA II* programs (sold prior to June, 1983) may have a "bug" in the analysis of covariance program which makes this analysis impossible to run. I discovered this in my program, and notified Human Systems Dynamics. I was told that the "bug" had already been corrected, but I had apparently been sent the uncorrected version. However, the corrected version was mailed to me free of charge, and it arrived within a few days time. This suggests that Human Systems Dynamics follows through with their customer support policy. The program is presently available through mail order only.

I was very impressed with the program once I learned, through some trial and error, how to avoid certain problems. In spite of the relatively minor weaknesses, it is a good program for the money.

DAISY PROFESSIONAL

Rainbow Computing, Inc.
$199.95
48K; Apple II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	C	B+	*Error Handling*
Documentation	A	B+	*Value for Money*

DAISY (Data Analysis Interactive System) *Professional* is a command-driven statistical software package developed specifically for Apple and Apple-compatible computers. You need a second disk drive and a printer to make full use of the program.

The well-written, easy to follow manual first instructs you to make a safety copy of the program disk. This procedure requires a special program (contained on the program disk) plus COPYA. It does *not* produce a backup copy. You still need the *DAISY* program disk or data disk (also copy-protected) to boot the program. The safety copy contains all the necessary statistical programs. I thought the need to boot the original program disk and insert the safety disk to work with bothersome. I would have preferred a master and backup disk (both copy-protected) in a $200 package.

Like its competitors, *DAISY* does not teach statistics. It is a statistical tool. (The manual provides a list of suggested texts to consult for explanations of procedures and verification of the accuracy of the results.) The first chapter, a procedural tutorial, introduces many of *DAISY*'s features. The program organizes data into tables where rows represent records (or cases) and columns represent variables. You can reference columns by name or number. The program normally stores data files in a hybrid text/binary form, although it can write and read standard text and DIF files. The following chart defines the size of the data table:

	ROM Size		
Number of Columns	48K	64K	128K (IIe)
5	420	640	1,290
10	260	400	830
20	130	210	480

The number of data points (columns by rows) is not a constant because of the allocation of memory for work arrays. Most of *DAISY*'s statistical procedures handle missing values; you need only enter "M" to designate a missing value. Data transformation procedures modify columns or create new columns, but you can only use two columns simultaneously in a given transformation. Transformations include addition, subtraction, multiplication, division, time series (lead or lag), absolute value, natural log, log base 10, raise to a power, raise "e" to the value of the variable, take the inverse, cumulative totals, standardized value, integer value, fractional value, and rounded value. You can select the transformations you want from the menus after using the command Tran.

DAISY Professional includes the following statistical procedures: (1) Descriptive Statistics—mean variance, standard deviation, standard error, second through fourth moments, skewness, kurtosis, minimum, maximum, range, median, sum, and sum of squares; (2) Frequency Distribution—class midpoint, number of cases, percent, and cumulative percent; (3) Cross-tabulation—by categories or with scaling, degrees of freedom, chi-square, association (phi), Cramer's V, contingency coefficient, cell counts, horizontal percentages, vertical percentages, percentages of total, expected cell values, index (ratio of actual to expected), and deviation (of actual from expected); (4) Correlation—bivariate, partial, autoregressive, and covariance; (5) Nonparametric Correlation—Spearman rank, Kendall rank, Kendall partial, and Kendall coefficient of concordance; (6) Regression—simple or multiple backward stepwise, forward stepwise, all subsets, and all subsets of a given size; (7) Hypothesis Testing—mean t-test, single rector ANOVA randomized or repeated related measures, two-way ANOVA with one measure per cell, Mann-Whitney U-test, Wilcoxon matched-pairs signed-ranks, Friedman two-way ANOVA, and Cochran Q-test. Although weak on ANOVA and missing Factor Analysis, this array of procedures compares well with other statistical packages, particularly most Apple statistical software.

DAISY Professional also offers some valuable and unique features. For example, you can write your own programs (such as an additional statistical procedure) in Applesoft and run them from within *DAISY* by using a series of ampersand commands included in the package. The command &Save also allows you to recover from most accidental resets by controlling the variable pointers. The program supports most 80-column boards, the extra memory on the Apple IIe's extended 80-column board, and the 160-column Videx Ultraterm. It also supports the cursor control and Delete keys of the IIe. *DAISY* includes its own random number generator (Applesoft has shortcomings) and its own error handling routines. Following a regression, it predicts dependent values for specified independent variables. A unique Hide command holds cases out of a regression computation for use in cross-validation.

DAISY Professional's computations appear accurate to five or six significant digits using the complex Longley data set. While the program performs computations, screen messages tell you the general stage. For time-consuming computations, these messages are reassuring. The program provides well-labeled and easily read output, but you have no control over the format. Outputs include warnings, however, such as explicitly identifying high independent variable correlations prior to computing regressions.

Although not exhaustive, the array of statistical procedures included in this effective package is extensive. You must learn the command language because the program does not offer menus and prompts, but it does include a useful tutorial and sample data. Once you have mastered the command language, you will find *DAISY Professional* fast and accurate.

ELF-THE STATISTICAL PACKAGE

The Winchendon Group
$250.00
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	B+	*Reliability*
Ease of Use	C+	C	*Error Handling*
Documentation	D	B	*Value for Money*

ELF-The Statistical Package, Version 5.0, is an extremely ambitious statistical software package similar to mainframe programs such as the *Statistical Package for the Social Sciences* (SPSS) and the *Statistical Analysis System* (SAS). You should already be familiar with the diverse array of statistical procedures contained within the package, as it is not intended to be a tutorial on the subject. *ELF* comes on two non-copy protected disks, and back-up copies can be made. The majority of *ELF* is written in Applesoft, which gives you the opportunity to both review and modify the programs. Machine language is used when added speed is essential.

The first of the two disks, Volume 51, presents a Utility Menu offering the following options:

(0) Quit
(1) Set System Parameters
(2) Create a New Database
(3) Change/Add Variable Names or Correct Data
(4) Add New Observations to Database

(5) Transform a Database
(6) Print Reports
(7) *ELF* Database Catalog
(8) Move Database to New Disk
(9) Convert Database
(10) Analyze a Database

The first disk deals with activities relating to *ELF* database preparation. You respond to either menu choices or screen prompts to perform the desired activities. The screen information and manual are both very clear in walking you through *ELF*. Errors, with the exception of resets and write protected disk messages, are trapped, and the program typically responds with the required input advice.

Database creation is straightforward. You begin by first naming the database, then each variable in sequence. Entering %END stops the procedure. Next, you have the option of changing any or all of the variable names. The final variable names are written to a dictionary file for the database (e.g., DEMO.DICT). You may then use a portion of the standard keyboard as a numeric keypad for data entry. Provisions are included for either right-or left-handed keypads. The former redefines the keyboard as follows:

7	8	9		7	8	9
U	I	O	become	4	5	6
J	K	L		1	2	3
M	,	.		,	0	.

ELF then defines a data entry screen format which is called a mask. The mask, which may contain multiple screens, lists the observation number and each variable name with ten digits of space to enter each variable value. Exponential values can be entered, and data may be written to the database or edited using the standard Apple cursor control keys. When all the data has been entered and the database has been closed, *ELF* will print a summary table with the name of the database, the number of observations, the number of variables and the name of each variable. Provisions are included in *ELF* to convert any existing sequential data file into an *ELF* database. In addition, *ELF* can translate files to and from DIF, Apple Plot, Curve Fitter, Scientific Plotter, and mainframe statistical packages using either fixed columns or free format (comma delimited). The only constraint is that the existing file cannot contain alphabetic characters which *ELF* will not accept.

The second disk, Volume 52, presents a Statistics Menu with the following options:

(0) Quit
(1) Set System Parameters
(2) ANOVA Menu
(3) Correlation Coefficients
(4) Discriminant Analysis
(5) Factor Analysis
(6) Probabilities (T, F, Chi Square and Normal Statistics)
(7) Scattergram
(8) Simple (Univariate) Statistics
(9) Stepwise Regression
(10) T-Test on Means
(11) Tables (Crosstabs, Frequency, Histogram)
(12) Return to Utility Menu

Statistics computes the mean, variance, standard deviation, standard error, minimium, maximum, range, sum, kurtosis and skewness for any or all variables in an *ELF* database. The Tables option presents either crosstabular tables using up to three classification variables, or histograms with a single independent variable. With crosstabular data, rim totals are computed along with values for Chi-Square, the Contingency Coefficient, and Cramer's V. The remaining options perform the procedures indicated, including one and two-way ANOVA, linear correlation and (stepwise) regression, univate regression (scattergram), and discriminant analysis. The factor analysis module includes both principal component and principal factor (squared multiple correlation coefficient or largest off diagonal element), diagonal estimates with Varimax, Quartimax, and Equimax rotations. The Probabilities option is not well explained, but substitutes for the lengthy appendix tables found in most statistics textbooks.

In terms of accuracy, *ELF* is limited in all of its computations by the Apple. Large numbers, rounding, nine significant digits, and single precision computations can effect the accuracy of the statistical procedures. Nonetheless, due to the sophisticated algorithms used by *ELF* to minimize these limitations of the Apple, corresponding procedures run with *ELF* and SPSS/SAS yield very similar results. Overall, *ELF* is a very useful, relatively inexpensive, and easy to use tool for someone who needs to perform statistical computations.

PLAIN VANILLA STATISTICS

Plain Vanilla Software
$50.00
64K; II+/IIe/IIc; *Applesoft* required

Overall Rating	C+	B	*Reliability*
Ease of Use	C	D	*Error Handling*
Documentation	A-	B	*Value for Money*

This unpretentious statistics program does simple statistical analysis in a straightforward manner. The

menu-driven program allows entry of data and statistical analysis using a number of common statistical tests, including descriptive statistics, simple regression, a variety of T tests, analysis of covariance, Chi-square, and Latin-square anova. Transformation of data is supported.

Plain Vanilla Statistics makes provisions for the correction of errors and combination of files by the merging and addition of cases. Sample sizes may be either equal or unequal. The documentation competently explains the use of the program and the statistical tests in a clear and succinct manner. It also lists references and formulas used. In addition, the documentation includes the maximum values (9998), but not the maximum sample size and number of cases supported.

The entered data can be stored, but not the statistical analyses. The printing and screen presentation of data is hard to follow because it is not in tabular form. Error checking is done for case entry. However, errors in placing disks in the wrong drive result in your exiting to BASIC. When entering data, the input command is used which makes it impossible to back up and exit once data entry has begun. Also, there's no provision for aborting a module and returning to the menu if the wrong module is selected. The seriousness of these problems in error handling makes using *Plain Vanilla Statistics* more awkward than is really necessary. This software needs improvement.

SIMULATIONS

Actuarial Micro Software
$395.00
48K; II/II+/IIe/III

Overall Rating	B	B	*Reliability*
Ease of Use	A-	D-	*Error Handling*
Documentation	A-	B	*Value for Money*

Simulations is comprised of three disks of statistical simulation programs: Monte Carlo Simulations, Monte Carlo Simulations Source Disk, and General Applications Simulations System (GASS). The overall packaging and organization of the extensive documentation are excellent, although locating specific material within each of the five sections is made difficult by the lack of an index.

The Monte Carlo Simulations (MCS) portion of the package was reviewed in previous editions of this book when it was being sold as an independent piece of of software. No significant changes have been made in the current version of MCS. The Monte Carlo technique generates unbiased samples whose data items are representative of their true probability of occurrence. MCS can be used for simulating probability functions that generate data for application to other statistical models or for analyzing the probability distribution of one's own data set. The main menu offers four commands that permit the user to create, to edit, to configure, and to to process data files. Both discrete (binomial, negative binomial, poisson distributions) and continuous (normal, log-normal, uniform, pareto distributions) functions are included in the system. Data files which are limited to 1,000 items, whose values are not less than 0 nor greater than 99,999,999, can be created and saved directly to disk. Also, MCS can read to memory files created by *VisiCalc*. The fit between a data set and the expected probability distribution is evaluated by chi-square high-resolution color graphics or can be printed as hard copy.

The source code for MCS is provided so that you can study and modify the structure of the program to accommodate specific modeling needs. Additionally, the Source Disk contains files such as Format, Configure, and Control that the main program must access on occasion to complete a specific task.

GASS is a collection of programs for the design, execution, and printing of stochastic (probabilistic) mathematical models. In essence, the user defines an algorithm consisting of as many as ten random, logical function, and compound variables. Restrictions in the design format of the model include: absolute values that cannot exceed 1E+17 or the program will crash because of overflow and stack problems; a storage capacity of 126,976 bytes (the limit of an initialized blank disk); the inability of the system to handle variables whose values are dependent on themselves. Once an algorithm is defined, up to 1,000 simulations are permitted whose results are summarized statistically (mean, variance, standard deviation, coefficient of variation, and range). However, the user can elect to examine data for each trial by saving the results of every run on disk and requesting output of either all data items or frequency and cumulative distribution of each simulation.

In many respects, GASS is a powerful program that permits rather sophisticated stochastic modeling within the constraints imposed by software and hardware limitations. Defining each variable of a model with GASS is accomplished by responding to a clear set of prompts. Likewise, execution of the model is straightforward, the user deciding the number of trials and whether or not to save the results of each simulation. Finally, the output format is selected from a number of options that range from summary statistics to detailed data displays. Because GASS is compiled into machine language, execution time is reasonable. One of the package's strongest points is the inclusion of several

examples that illustrate in a step-by-step fashion the proper way to use GASS as well as MCS.

Potential buyers of *Simulations* should be aware of the following points. First, GASS does not assist the user directly in developing a mathematical model; rather, the program is a utility for transposing an existing mathematical model into an algorithm that can be executed by an Apple computer. Despite statements to the contrary (e.g., "no prior knowledge of mathematical statistics is assumed or required...") by the designers of MCS and GASS, a sound understanding of modeling, mathematics, and statistics is in fact essential for the construction of a valid model and for the evaluation of the results of a simulation. Second, GASS does not include error-catching statements, Hence, the user, if he is to accept the simulation results, must be assured that his model and its parameters are valid and accurate. Finally, potential overflow problems preclude simulations whose function variables incorporate exponentiation, multiplication by large numbers, or division by small numbers.

My overall impressions are quite favorable, bearing in mind the program's aforementioned limitations. I regard this package as an excellent, serviceable, first-generation modeling program for microcomputers. However, considering the price, a buyer may wish to acquire initially the $50.00 demo package, which includes all of the documentation and a demo disk. The buyer will then be in a better position to assess the efficacy of the package for meeting his personal modeling needs.

SPEED STAT

Shaffer & Shaffer
$99.00
48K; Apple II/II+/IIe

Overall Rating	C	B	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	C	C+	*Value for Money*

This program is designed to emulate the frequency and cross-tabulation methods of statistical analysis found on mainframe computers. You first define the variable by name and the type of data (alphanumeric codes or a complex set of numeric options). Data is entered initially as part of the same module for each variable. Missing values are accepted. Entry of the last variable is awkward, because, if you press Return after the last variable, another unnamed variable is added. Update of data must be done through another module, a fact not completely clear in the manual. Data from other programs can be added by the use of DIF files; however, the program does not allow the creation of DIF files for the output to other programs. The tables produced by the report module are very similar to those of *SSPS*, one of the most widely used mainframe systems.

The strengths of the program are in the outstanding visual charts produced. Data entry and setup are not difficult, and the print routines are easy to set up. The documentation is spotty. The organization and the tutorial are quite good, though not perfectly clear. However, there is no indication of the programming language used. Information on how to initialize a disk is buried in the middle of the manual and the index is meager.

The program has some inconveniences in organization, such as the need to go back to the Main Menu after viewing a report on screen to print, the ability to only save one set up of the statistics on a disk, and the inability to save the report formats once they are set up. The size limitations of the system depend on the number of variables, with an absolute maximum of 2,048. Only one disk per data set is permitted.

TWG/ARIMA

The Winchendon Group
$350.00
($50.00 student discount)
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

TWG/ARIMA is The Winchendon Group's Auto Regressive Integrated Moving Average software package designed to compute Box-Jenkins forecasts using time series data. It obviously is not intended for the general audience, although the manual does offer a good overview of the forecasting technique involved and is written in an understandable fashion.

TWG/ARIMA comes on a single disk which is not copy protected, so you can make back-up copies. The programs themselves are all written in Applesoft, making them both listable and modifiable. *TWG/ARIMA* defines data within two files: a dictionary file containing the variable names, and a data file conceptually stored in a "rectangular" format where rows represent observations and columns represent variables. *TWG/ARIMA* uses any sequential data file as a database as long as there are no alphabetic characters in it. This procedure is well explained in the manual.

Much of the *TWG/ARIMA* package covers the development and maintenance of databases. After the database itself is given a name, names are assigned to each variable and a verification procedure prompts you to confirm these names. An input screen, or "mask," is then set up for data input. Editing makes use of the standard Apple cursor keys (Escape-I,J,K,M). Extensive variable transformations are possible, including the creation of new variables. To facilitate data entry, software keyboard options are available to convert the following keys:

1	2	3		7	8	9		7	8	9
Q	W	E		U	I	O		6	5	4
A	S	D	OR	J	K	L	INTO	1	2	3
Z	X	C		M	,	,		,	0	.
(left-hand)				(right-hand)						

A program called *COPYTEXT* is also included to move and back up *TWG/ARIMA* databases.

The *ARIMA* statistical menu has options for: (1) Identification; (2) Estimation (and Diagnosis); and (3) Forecasting. *ARIMA* is a mathematical technique used to forecast a variable based only upon the variable's past values; there are no outside influences taken into account. The Identification begins by selecting a database and a specific variable to be analyzed. The values of the variable (i.e., the time series) must then be made "stationary." To do this you must use such appropriate data transformations as Box-Cox, centering, or differencing, which are displayed on screen. Seasonal adjustments may also be taken into account within the model.

Following the transformations, you can graph the data. The graph includes the database name, variable name, mean, variance, number of observations used, number available, degrees of freedom, and any transformation, differencing, or centering that may have been done. *TWG/ARIMA* prints both the autocorrelation and partial autocorrelation coefficients, along with a graph of their statistical significance. These intermediate identification stages can be saved in a file named TWG/DATABASE NAME.XXXX, in which you select any title for the last segment of the file name, keeping in mind the 30-character DOS limitation on file names.

The estimation and diagnosis phase of the program, like earlier phases, presents questions on the screen which walk you through the procedures necessary to develop estimates of the autoregressive and moving average coefficients from the transformed, or model data. You select the database, model, and number of time periods before checking for backcasting, variable, number of observations to use, degree of autoregression, degree of differencing, degree of moving average, seasonal parameters, constant/intercept, convergence criteria (percent change in sum of squares, percent change in parameters, and maximum iterations), and starting parameter estimates. *TWG/ARIMA* does not include options for the exact maximum likelihood estimation. The iterative computations proceed, while an indicator in the upper right-hand corner of the screen shows the program is working. The outputs of this procedure are: (1) summary table—sum of squared errors, residual variance, number of observations, degrees of freedom, the raw constant value, and a list for each variable with its value, t-statistic, and significance level; (2) correlation matrix—between coefficients if there are more than one; (3) autocorrelations—values and graphical representations; and (4) a sum-of-squares grid. As in the previous stages, this version of the model can be saved as a file for forecasting.

Forecasting is the final phase of *ARIMA* and it, like the earlier phases, presents screen prompts to walk you through the procedure. You are asked to identify the database, model (from the identification phase), version (from the estimation and diagnosis phase), the number of time periods ahead to forecast, the time period to use as the base forecast period, and the desired confidence interval. The output of this phase includes: (1) a report containing the time period and forecasted value, along with the upper and lower confidence interval values; (2) a report containing the time period, the actual values (if they exist), the forecasted values, and the difference between actual and forecasted values; and (3) a scaled graph containing the time period (i.e., observation), the actual values, forecasted or predicted values, and the upper and lower confidence interval values. Sample outputs from all *TWG/ARIMA* procedures are contained in an appendix within the manual.

Overall, *TWG/ARIMA* is a straightforward, easy-to-use product. The package includes well-known sample databases from Box and Jenkins' *Time Series Analysis, Forecasting and Control* text. *TWG/ARIMA* will provide economists, students, and other professionals an alternative to mainframe *ARIMA* analysis.

TELECOMMUNICATIONS

Who Is Your Computer Talking To At Three A.M.?

If you don't have a modem, you're probably not very aware of the world of telecommunications. You probably don't know about the vast on-line databases where you can look up information on everything from current movies to OPEC oil prices, not to mention complete stock market reports. You probably don't know about MAUG, the Apple users group on the Source, or the multitude of computerized bulletin boards across the country, all available to you and your computer through the telephone lines.

You're also free of worry about baud rates, protocol settings, parity, stop bits, and outrageous telephone bills.

Most anyone who's into predicting the future of personal computers will tell you that modems, or telecommunications in one form or another, are here to stay (so if one has moved into your guest room, you might as well just remodel around it). If your computer at the office isn't already connected to a local area network, it soon will be. Do you use an automatic teller for simple transactions at your bank? The machine that reads your card and spits money at you is a computer (the brand name is probably stamped on the front) connected to your bank's main computer via telephone lines. Many banks take it one step further by offering you access to your account with your home computer. Computers have replaced that Wall Street standby, ticker tape, in your stock broker's office. He, and you, can view the rates by dialing up Dow Jones, with some of the software reviewed here.

The big on-line databases, like The Source, charge you for their information. You have to open an account with them, and you receive a monthly bill that shows how much time you've spent logged on. Some smaller databases run by users groups or other organizations also charge you for their time. Most out-of-the-garage on-line bulletin boards are free to the caller (except for the phone bill, of course). While the big database services have sections of interest to just about everyone, they can get expensive. The little bulletin boards tend to be more specialized, but cheaper. If you can find a bulletin board you like, you may be happier calling it several times a month than making less frequent calls to The Source. It all depends on what you want out of your modem. Just about all databases assign you a password and a private mail box where you can receive private mail from your on-line friends. Wonderful relationships have begun over the phone lines. The publishers of Whole Earth Software Review carry on free-for-all reviewing sessions on The Source and use the edited results in their publications. Find a bulletin board that specializes in your favorite topics—programming, science fiction, show business, hardware—and dive right into the fray.

This section deals with software that helps your computer talk to other computers. The programs reviewed here cover a fairly wide range of telecommunications tasks. The most sophisticated programs are very flexible. With them (and that friendly modem) you can dial up anything from a local bulletin board running on your neighbor's Atari to The Source, to the mainframe at the office. These complex programs allow you to store files with all the correct settings and passwords built in, so when you call, say, Dow Jones News Retrieval, you can have the computer log you on and automatically download files. Or you can use the software in a less automatic mode so you can interact with the distant database. When you call a mainframe, you can use "terminal emulation" which makes your Apple think and act like a standard mainframe terminal. It's a good idea, if you're into this sort of thing, to know a lot about the terminal you're emulating and study the program you're using carefully.

Further down the ladder are the limited communications packages, designed primarily for hooking up two computers and transferring files. With some, you don't even have to use a modem if you have the right cables to connect the computers directly. If you've been using some other brand

of computer at the office (not to mention any initials) and now you're switching over to the obviously superior Apple, you can use one of these programs to transfer, say, all your spreadsheets, word processing documents, and database. Just make sure the transfer program you use leaves the documents in a format your Apple spreadsheet, word processor, or database can read.

Modem manufacturing is a growing, competitive market, so you can doubtlessly find exactly what you need. Some modems are devices external to your Apple, plugging into a serial port. Others are on cards that you can install right inside your machine. If you're a newcomer to telecommunications, you should research modems and software before putting any cash on the line.

Communications

APPLE ACCESS III

Apple Computer, Inc.
$150.00
128K; III; Pascal

Overall Rating	B+	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	C	B-	*Value for Money*

This terminal emulation program allows your Apple III to act as a DEC VT-100 or DEC VT-52 terminal, but does not support all of the capabilities of the terminals, such as 132-column display, double-high and double-wide characters, smooth scroll, and special character attributes (bold, underline, blink). While reviewing this program, I used *Access III* to communicate with a wide range of computer systems and found it a fine product.

Apple Access III does many things well. Menu-driven, it allows you to reconfigure for different computer systems while keeping your standard configuration as a default. It handles both full-duplex and half-duplex communications and supports a wide variety of ASCII communication protocols. You can record all or part of your session to disk or printer and change the recording file at will, so you can organize your work. You can transmit all text files except ASCII and Pascal from disk to the remote computer. The program runs under either the Business BASIC or Pascal systems because it comes with both a Pascal code file and a short Business BASIC program with a sixty-one block invocable module that does all the work. The disk also contains a sample SOS.DRIVER file and a font file called ACS3-FONT—essentially the STANDARD character set extended to handle the VT-100 graphics character set.

While *Apple Access III* does the job it sets out to do and does it well, it has some problems. For one thing, the program comes as Special Delivery Software with version 1.0 on the distribution disk. The latest version is 2.0. You should get your dealer to upgrade your disk—if he has the 2.0 copy. Many that I contacted did not. For another thing, the manual probably contains all the information that you need, but finding it can get difficult because of the poor organization. For example, the manual contains frequent references to "figure n," but all the figures appear together near the back rather than scattered throughout the text as needed. The information on configuring the system to run with either Pascal or Business BASIC lacks cohesiveness. Another problem is the easily implemented missing features, such as auto-dial and a simple macro interface to facilitate connections with remote computer systems.

I would like to mention a few miscellaneous points. Neither the original nor backup disks are copy-protected, which facilitates configuration. Also, although the manual fails to mention it, the cursor flashes while you are recording but is solid when you are not recording. The manual says that you need to check a status menu to find out whether you are recording or not, but the "cursor method" works just fine. Finally, although Apple Computer supports the product well, the regional distributors have not done as well in distributing upgrade disks to the dealers (true for almost every Apple III product).

If you need a DEC-compatible terminal emulator, I cannot think of a package for the Apple III that comes close to *Apple Access III* in quality. As a simple communications package, however, you may want something cheaper.

COMPUSERVE

Compuserve, Inc.
$39.95 to become a subscriber
$12.50 per connected hour: 8 a.m.-6 p.m.
$6.00 per connected hour: 6 p.m.-5 a.m.
48K: Apple II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	D	A-	*Value for Money*

Compuserve Information Service is a subscription service which any microcomputer owner can use if he has a modem and has received his password from a Compuserve representative. Like *The Source*, *Com-*

puserve has a one-time subscription fee. At the present time, the fee for a non-prime time user is only $39.95, and thereafter you are charged $6.00 per hour for on-line service from 6 p.m. to 5 a.m., and $12.50 an hour from 8 a.m. to 6 p.m. (prime time).

The hourly fees of *Compuserve* are less than those charged by *The Source*, and *Compuserve* does not charge a monthly minimum, as *The Source* does. At the time of this review *Compuserve* had more subscribers, less expensive rates, and faster response time than *The Source*—and yet remains less well-known. In addition, *Compuserve* gave three free hours to every subscriber when he first signed on. (It isn't clear, however, whether this "free time" policy will be continued indefinitely.

Compuserve offers similar services to those of *The Source*: electronic mail, electronic catalog shopping, education, games, Dow Jones updates, word-processing, entertainment—in fact, over 1,200 different functions are available to subscribers. These services are all easy to access and use on *Compuserve*. One feature that *Compuserve* offers which *The Source* does not is a simular of "CB" radio channels. People on the service can talk to each other via keyboard, just as CB users do over the airwaves. The user has over 30 channels to choose from and can talk to anyone across the continent who happens to be on the "CB" at the same time.

Compuserve users must re-subscribe to the service if they wish to have the ability to use the *Compuserve* services during the day. At the time of this review *Compuserve* subscriptions were available through Radio Shack stores (or call direct toll free, 800-848-8990, if you are interested). The reference manual for *The Source* is a model of good documentation, and unfortunately *Compuserve's* users' manual falls far short of this ideal. But, like *The Source*, *Compuserve* makes extensive use of help menus which more or less make the reference manual unnecessary.

Currently, *Compuserve* appears to be a very good value to the microcomputer owner looking to explore the realm of telecommunications and information service networks.

DOW JONES SPREADSHEET LINK

Dow Jones Software
$249.00
48K; II/II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	C	C	*Value for Money*

Dow Jones Spreadsheet Link helps you use the information contained within the Dow Jones computer with your spreadsheet program (which may require more memory than the 48K listed above). It works with either *VisiCalc* or a 6502-based version of *Multiplan*. *Spreadsheet Link* gathers information from Dow Jones. It is not a template or model for your spreadsheet program. You must first build whatever model you want to work with, save it, and exit the spreadsheet program to start *Spreadsheet Link*. That program then reads the model, extracts the codes, dials the Dow Jones service, obtains the requested data, and formats the data for spreadsheet entry. Now you can reenter the spreadsheet program and combine the data file with your original material.

After making a working copy of the program, you must answer some questions to match it to your hardware. In particular, the program asks you about your printer and modem, the type of spreadsheet, the phone numbers for your local data network, and your Dow Jones password. *Spreadsheet Link* supports either manual or automatic dialing. In addition, another option allows you to pull data from the *Dow Jones Market Analyzer* instead of the computer in order to save you on-line time. (The purchase price includes one hour of free time.) Take heed, because the program always operates with the options you first pick until you reinstall it with the new options you've chosen.

Once it's set up, you should first run the sample session as outlined in the manual to get a basic understanding of the program. I had trouble following the step-by-step description because the commands for both spreadsheet programs are scattered throughout, but you can find your way through it. You probably won't have to refer to the reference section except to get the proper codes for the information you want.

Spreadsheet Link includes extensive error trapping. For example, should line noise affect the data, the program will attempt to recover by re-requesting the item. Should this fail, it will break the connection to prevent further charges. You can then reconnect at a later time, when conditions have improved. It detects and will correct some disk errors; for example, it will create a partial data file should you attempt to put data onto a full disk.

The program disk provides several suggested templates, but you'll probably want to use your own. I created several small and one very large template for this review. All worked well in all three spreadsheet formats.

As an added bonus, *Spreadsheet Link* gives you a terminal program to access other Dow Jones databases. While you cannot save the information to disk, you can print anything coming through *Spreadsheet Link* for a permanent record. I had trouble printing using an old Apple Serial Card, but I am told that the program will work with the newer Apple Super Serial Card.

Spreadsheet Link makes a welcome addition if you use a spreadsheet for stock analysis. Though it works well, the price seems high. You need to carry out your own price/value analysis to decide if you want this software.

HAYES TERMINAL PROGRAM

Hayes Microcomputer Products, Inc.
$99.00
48K; Apple II+/IIe

Overall Rating	B-	A	*Reliability*
Ease of Use	C+	A	*Error Handling*
Documentation	A	B-	*Value for Money*

The *Hayes Terminal Program* is designed to work directly with the Hayes Micromodem in the Apple computer. It is sold with the modem card, or as a stand-alone terminal program. The three formats most often found with the Apple computer (Dos 3.3, Pascal, and CP/M) are all supported on the data disk used with the *Terminal Program.*

The program is menu driven. Communications commands include the ability to originate, answer, and terminate calls. File commands create, receive, send, and list files. System configuration is also controlled by menu commands. The entire communications environment may be controlled by the user (with the changes allowed for one-time use or permanently recorded to disk).

Sending files may be done with one of three protocols: stop/start, line, and verification. The stop/start uses the standard Ctrl-S and Ctrl-Q (or any other characters you define). Line protocol will send each line and wait a defined interval before sending the next line. Verification protocol works between two Terminal programs, and sends blocks of data repeated one or more times until data transfer is guaranteed, or the defined number of tries is exceeded.

NETWORKER MODEM

Zoom Telephonics
$129.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

A modem allows you to communicate with other computers and their users through your computer. The *Networker* should be your first modem. It will probably be your last. The package consists of a card that plugs into one of the Apple's slots (preferably slot #2), a switch that attaches to the outside of the computer, the communications software, and a modem complete in one box. Although compatible with other communications software, the modem requires no additional serial card or software. In addition, you get a money-saving subscription rate to *The Source*, a popular information utility.

The sixteen-page manual looks like the epitome of clarity to anyone who has ever tried to divine the inner workings of the average modem from its documentation. The concise and well-written booklet takes you step-by-step through installation and operation of the system. Following the instructions I installed and ran the modem in fifteen minutes—perfectly.

The simple but adequate communications software comes on one copyable disk. You can also operate the modem without a disk drive, using the on-board firmware option. You'll find the menu-driven program easy to use. It permits uppercase and lowercase display if you have an Apple IIe or II+ with a Dan Paymar lowercase chip and wire shift key modification. The 32,000-byte memory captures and stores information in a buffer for later transfer to disk if desired. A simple Control-O returns you to the Main Menu at any time to make changes. The software provides options for half- or full-duplex and line-feed (which govern how text appears on your screen). It also supplies a Break key option, required by a number of computers.

To establish communications, you install the card and then boot up the package. You dial the number you want to reach (no automatic dialing), listen for the high pitched tone indication connection, flip the switch on the little box on the outside of the computer, hit the Return key, and hang up the phone. Hit Return a few more times and you are telecommunicating. It worked the first time for me.

If you set the trap on, you can capture the information as you receive it and play it back later. I took a batch of information and converted it to a *Bank Street Writer* file (using that program's Convert function) and manipulated it (edit, delete, etc) like any text file.

Talking to other computers is fun. Unfortunately, a

lot of other modems make it difficult or expensive (or both). *Networker* makes it easy and very, very cheap. Although other hardware connect you faster and with less effort (through automatic dialing and 1200 baud rates) and other software has more power (storage of phone numbers for automatic dialing), they can't beat *Networker*. If you later discover that you really need 1200 baud and auto-dial, you can safely sell this package to your best friend. In the meantime, you'll get more than your money's worth. If, like me, you use a modem only once every few days to call up your favorite bulletin board service, this little package will give you pleasure for life.

P-TERM (The Professional)

United Software Industries
$129.95
64K; II/II+/IIe; language card

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	A	*Value for Money*

P-term (The Professional) transfers files to or from another computer. Modeled after the *Z-term CP/M* modem program, it can transfer files up to 17K normally and larger files with the auto-save feature. It provides unattended remote access and has password protection. Macro support allows for easy log-ons or often-used commands. It follows the conventional slot assignments of Pascal and supports a variety of modems. Some features, however, can only be accessed with more complex modems.

The modems supported by the program are the following:

(1) Hayes Associates Micromodem II
(2) Apple Communications Card
(3) SSM AIO Board
(4) CCS Asynchronous Serial Board 7710a (or D)
(5) ESI Apple LYNX System
(6) Novation Apple CAT
(7) Novation Apple CAT Externam Bell 212 1200 Baud
(8) Hayes Associates Smartmodem (with compatible interface)
(9) Mountain Computer, Inc. CPS Card

Other cards, if Pascal compatible, should present no problem since you can easily redefine much of *P-term*. Lowercase capability, using the game paddle Shift-key modification is supported.

There are two modes of operation: command and terminal. Terminal mode sends anything you type to the computer and anything returned prints on the screen (and printer if active). You can only give commands to *P-term* from the command mode, which contains two menus. With some of these commands you hear a short click each time you type a key or adjust the screen width (by having *P-term* issue a carriage return after a certain number of characters have been received). This will help 40-column users or terminals that don't issue a return on the eightieth character. If your modem has the capability, you can change the transfer or baud rate. You can view the directory of the disk in any drive, as well as any text file on the disk. A copy buffer will save all incoming data as well as keyboard input in a 17K buffer. When full, this buffer can be cleared or written as a file to disk.

You can dial another system manually or with macros. *P-term* can also re-dial the number once or until connection is made, and will automatically log-on when using macros. Macros are a powerful feature that allow the use of one to several keys to replace often-used, lengthy, or complex commands. *P-term* allows up to twenty-six sets of macros to exist with sixteen macros in each set. On cold boot, macro set A is the default, but you can easily change this to another set. A nice safety feature is that the program will not exit until the buffer has been cleared manually or has been written out to disk, which clears it automatically.

A few negative points surfaced. The disk cannot be removed from its boot drive. Because it is such a large program, it has to swap in segments from the disk when necessary. This means that single-drive users will be limited to the amount of files they can store on disk. In addition, several of the command options can be forgotten while in terminal mode yet are not listed on the command mode menu. Such things as which key speeds up or slows down the sending of a file, which key returns you to command mode, or which key displays the current macro set can be found in the manual, but it takes time. A command card would probably help.

The program comes with a thorough 108-page manual that explains in detail all the commands available and the transfer modes used for uploading or downloading files. You can change many of the features and defaults. Explanations and examples are provided for creating your own macros. A list of the features available for each modem definitely supported is also included.

P-term is thorough and complex. Its ability to transfer files in several modes, including Christensen protocol, allows it to communicate with a variety of systems. Unattended remote operation allows *P-term* to act as a host for remote use of the computer, while

the use of macros simplifies use. All in all, this is an excellent program.

SOFTTERM 2

Softronics, Inc.
$195.00
128K; IIe/IIc

Overall Rating	B	B+	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	B-	B	*Value for Money*

If you need a program that works with other terminals, computers, or information utilities you might be interested in this package. If you just want to talk with the computer down the block, you probably want something simpler.

Not just another standard communication package, this program interfaces with most of the standard terminals and can automatically log onto information sources like Compuserve, Dow Jones, and NewsNet.

The package includes a large manual, two unprotected disks, and a three-button keypad. I was pleased that I was able to use the program immediately. The manual explains the program's capabilities and tells you how to back up the system disks and configure your system to the program.

The software includes a phonebook of macros that enable you to communicate with most main frames, minis, terminals, and communications services. While you're configuring your system, if you notice that your type of printer (or modem, or whatever) isn't included on their list, there is a special telephone number you can call for help. This number also advises you of any updates.

Once set up, it's time to begin calling other services and computers. It is quite easy to access the program's internal phone book, which contains up to fifty entries. From there you choose the service you want to log onto; the computer does all the parity, speed, dialing, and bits/character checking. Once connected, you can save money by using another macro to move you quickly through the other system's menus to get you straight to your information. To download information (in normal ASCII format) you can either dump it directly to your printer, an internal buffer storage, or a disk. By pressing a couple keys, you can put the activity on hold, change the mode you're in, and then continue with little loss of time.

You can also connect directly with another terminal, allowing you to emulate over twenty terminals. (More terminal emulations are available from the vendor and through other users.) With these emulations, you can simulate key combinations and specialty keys not normally found on the Apple, like Clear (to the end of the line), Home Cursor, Insert Character, and Soft Reset. Depending on your hardware, all of this can be accomplished at up to 9600 bps. Not bad, eh?

The only problems I had were caused by the manual, which is rife with technical jargon. While its scope is formidable, its effectiveness is questionable. I don't fault the documentation writers for attempting to cover all the program's capabilities. I just would have appreciated an overview section or a quick reference card.

Should everyone run out and buy this program? No. In fact, most people shouldn't. But anyone who often needs to use information services or does terminal work should. In time, as you become familiar with the program, its complexity will seem less daunting and it will prove its worth. And just think of the information lurking within your terminal's grasp just waiting to be accessed.

THE SOURCE

Source Telecomputing Corp.
$49.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B-	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	A	B-	*Value for Money*

The Source is a timesharing system, rather than a specific program, for microcomputers. With this system, you have access to a large number of programs and databases housed in several mainframe computers located in Virginia. The $49.95 price noted above is the sign-up charge, which gives you a manual and a password. In addition to this, there is a $10.00 per month subscription fee and hourly charges which vary by time of day, data storage fees, and baud rate used. Both 300 and 1200 baud are available through the local TYMNET or TELENET data network. *The Source* is a subsidiary of The Reader's Digest Association, Inc.

There are many features of *The Source*. These include several modes of communication: electronic mail, chat (realtime conversations), post (a public bulletin board), voicegrams, and mailgrams. The information services include: *Source*Plus* (added cost features), business databases, shopping by catalog, education and careers, government and politics, home and leisure, news and sports, science and technology, and finally, travel, dining, and entertainment.

The *Source*Plus* features *Media General*, a way of obtaining historical and current performance comparisons for common stocks. The commodity *News Service* tracks activity in the major future markets. Management Contents, Ltd. makes abstracts available from 27 business publications. *Comp-U-Star* is a discount catalog electronic shopping center.

With the business programs you are able to access current stock information and create portfolios that may be kept up to date on a daily basis. In addition to those functions available through *Source*Plus*, the *Unistox* database of UPI is available. Command files will access this database automatically. For general information, *The Source* accesses the UPI business news and obtains opinions from Raylux Financial Services. In addition to the *Comp-U-Star* database, you are able to use *The Source* to barter, order records and tapes, order books, and get tapes of classic radio programs. There are educational programs ranging from simple counting drills to sophisticated computations in math and science. Methods of obtaining college financial aid are on *The Source* for callup. Finally, for employers to access, there is a database of resumes of people looking for work.

You can keep track of the government on a daily basis through many of the UPI entries. If you wish, you may even set your computer up as a teletype and get a running UPI newswire on your desk (of course, computer hookup costs will be running!). Further, many games may be played through *The Source*. There is also a home medical guide where you respond to a variety of general questions and the computer returns descriptions of various ailments. Should you be interested in traveling, *The Source* can help you plan your trip. Both international and domestic air schedules are in the system. When you have your trip set up, there is a travel club through which you make your reservations and get the tickets via regular mail. Once at your destination, use *The Source* to find a good restaurant or learn about what local wine to order. For after dinner entertainment, you may consult *The Source* for the latest movie reviews.

If you are interested in doing something out of the ordinary, *The Source* allows you to create your own files and programs in several languages. Text editing may also be performed, with very professional results. Some users offer other services, such as typesetting, so by using *The Source*, you can write, edit, check for spelling, and then transmit text to a typesetter. You will receive camera-ready copy of your work. *The Source* also encourages public use of the system for information exchange. To that end, they have set up a public area where users establish "magazines." As other users read the material, the original publisher is credited with a royalty from the reader's usage fee. *The Source* is now experimenting with a computer conferencing capability termed *PARTICIPATE*. It is only now in the experimental stage, but promises to provide users with common interests a forum for conferencing and exchanging ideas.

TEKTERM

Fountain Computer Products
$175.00
48K; II/II+/IIe/IIc; serial card

Overall Rating	A	A	*Reliability*
Ease of Use	B+	C-	*Error Handling*
Documentation	A	A	*Value for Money*

Tekterm makes an impressive new addition to communications software. Because of its special ability to emulate a Tektronix graphics terminal (hence the name), *Tekterm* is the only terminal program suitable for people who need graphics communications. The program also offers a host of other features: data capture, keyboard remapping, 70-column display (with upper and lower case) requiring no hardware modifications, macros, and on and on.

The program offers two major modes of operation: command and terminal. The command mode displays a menu of twenty one-letter commands and eight status indicators. These commands allow you save everything onto disk, call up saved files, transmit text files, choose upper- or lowercase, and call up a second page of menu. The second page of menu supports the usual operations of the Hayes Micromodem II. *Tekterm* also supports the Apple Communications Card, CCS 7710, Apple CAT II, SSM Apple Modem, Multi-Tech Modem II, and the AIO-I. In the terminal modes, you can choose a regular Apple text display (with lowercase in inverse) or a twenty-four line by 70-column display with upper- and lowercase and descenders. While in the regular text mode, you can communicate up to 19,200 baud; the 70-column mode handles only 600 baud. Both terminal modes include extra characters not normally generated by the Apple keyboard.

The Tektronix terminal sets the industry standard for computer graphics. Thousands of programs exist in the Tektronix graphics format; *Tekterm* allows access to most of these programs without modification. It emulates the Tektronix 4010 by trapping for the Shift-Control-M character, which turns on the graphics mode. In this mode, the program interprets all subsequent characters to the terminal as Tektronix graphics commands and retranslates them into Hi-Res instructions for plotting on page 1 or page 2 of the Hi-Res

screen. What about the loss of resolution? The actual Tektronix screen boasts 780 by 1,024—ten times that of Apple's Hi-Res resolution. However, *Tekterm* captures the full scale information and uses the text file transfer command to plot the data on a plotter such as the Tektronix 4662 plotter for a full resolution hard copy.

I found no major shortcomings in the 1.2 version of *Tekterm*, although I would have liked more implementation of the options contained in the Hayes menu. The only carryover problem from the original version is an inadequate discussion of the cross-hairs feature. It remains a mystery to me how you turn it on. Otherwise, this professionally written, powerful communications package approaches its marketing claim: "the most powerful and versatile communctions package on the market." The emulation ability alone may even increase the sales of Apple computers—when buyers compare the price of a Tektronix terminal with the cost of an Apple system using *Tekterm*.

TELE-PORTER

Sensible Software
$79.95
48K; II+/IIe

Overall Rating	B	B+	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

This file transfer program sends and receives files, or entire disks, between Apple II computers. It transfers files formatted in operating systems, including CP/M, Pascal, DOS 3.3, ProDOS, and SOS. The program uses very efficient techniques for data transmission and compression, along with error checking.

Tele-Porter is menu-driven and quite easy to use. Some of the transmission screens contain so much information about what is happening that they will be incomprehensible for inexperienced users. But that doesn't effect program operation—you don't have to understand all the displayed data to use the program effectively. You do have to enter data about the host and receiving computers when you first boot the program. Between file transmissions both computers can send messages. Files can be queued for transmission, and you can catalog disks on both ends. The transmission process can be monitored either graphically or by chart on a number of transmission parameters.

You can have *Tele-Porter* send a limited-use version of itself to the receiving computer, so only one user has to buy the program. It supports a wide variety of modems and can transmit at up to 2400 baud with wildcard selection of file names. Even without a clock card, *Tele-Porter* can handle late-night, timed transmissions.

The documentation is beautifully organized, allowing for rapid initial use and including a well indexed and complete explanation of all the features. An excellent reference section clearly explains all the commands. Appendices explain how to place a call, the errors, and the transmission counters. An excellent glossary covers data communications terms.

While its usefulness is limited, this program is very well designed and executed. If you regularly transmit files to another Apple II, take a look at *Tele-Porter*.

TERMEXEC, Version 2.0

Quinsept, Inc.
$95.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	C+	B+	*Error Handling*
Documentation	B+	A	*Value for Money*

A complete, quality communications package, *TermExec* provides automatic log-on and communications with all major host computers, electronic bulletin boards, commerical information services, and other micros. The current version runs on the Apple II+ and IIe; future versions will run on the Apple IIc and PRODOS. An expanded keyboard feature for the II+ includes the 128 ASCII character set and a Break signal. The program also supports the IIe 80-column card. Future versions will support the Videx card for the II+. The package comes with a comprehensive manual that takes you through the paces. Because of the multiplicity of commands offered by *TermExec*, you'll find it worthwhile to work through the tutorial section.

TermExec contains the now-standard features: macro commands; data capture up to the full capacity of the disk; some DOS commands from terminal mode; batch command files; interconversion of file types; keystroke commands; and many more. Unusual features include: The Christensen XModem protocol (well known to CP/M users) for error checking and transmission of any type of file; a scrolling buffer that allows you to review text that has gone off the screen vertically, plus lateral scrolling that gives an 80-column look to the II+; a full screen editor with global search and replace and cut-and-paste capability; and Diversi-DOS, the ultra-fast DOS that permits file access three to nine times faster than DOS 3.3. This plethora of options allows you to work some "big system" tricks. For example,

people commonly work on major hosts during off hours, when rates are lower. *TermExec* can execute a series of commands at a predetermined time to dial another computer, issue commands, capture data, and log off—all without a clock board, because it uses the 6502 clock.

TermExec is professionally put together, with some nice touches. Because it tries to be comprehensive, you'll need some time to get up to speed and become comfortable with all of its options, but the effort is worthwhile.

TRANSEND II

Transend Corporation
$119.95
64K; II+/IIe/IIc

Overall Rating	B+	B+	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	B	*Value for Money*

Transend II is one of three well thought out telecommunications programs from Transend Corporation—*Transend I, II* and *III*. Unlike many other 300/1200 baud programs, *Transend* endeavors to make itself understandable and useful to the first-time telecommunications user. The manual, although it borders on the technical, is useful and well organized. Once you are familiar with it, you can easily find the answers to your questions. The manual begins with the assumption that you know little or nothing about telecommunications and moves along from there. It walks you through each step of a series of different transmissions, discusses in detail its verified file transfer mode, and contains an extensive installation program to make set-up easy for the various Apple configurations.

Transend II is also one of the most "menu-happy" telecommunications programs I have ever seen. It seems to have a menu for everything—a great help for the first-time user. When you are more familiar with the program, you can use toggle switches to turn off these menus.

Transend also offers other features that make their program attractive: extensive customer support and an upgrade/update program (if you own *Transend I* you can upgrade to *II*, or if you own *II* you can upgrade to *III*). You also get a free subscription to *The Source* with your purchase.

The only truly objectionable feature of *Transend II* is the inability to make back-up copies. The package includes two copies of the program, but the number of parameter sets you can store on the diskettes is limited to about six per disk. Your own applications may never require more than six, but if they do, this program is not for you.

I had a few minor problems configuring *Transend* to run on my system. Once up and running, however, it performed well and fulfilled the promises made in the documentation. Also, like many of the better programs on the market,*Transend* allows you to do more than just send and receive data from one Apple to another. Data compression strips all non-essential wordspaces from your text files, sends the file, then reconstructs it at the other end. This, of course, can save you telephone charges. *Transend II* also gives you the estimated transmission time of a file transfer, another useful tool for estimating costs. *Transend II* can send or receive virtually all text formats including all DOS 3.3 file forms. It also supports X-on/X-off protocol—a very useful feature for talking to other systems at 1200 baud and now practically a standard in the field of telecommunication for file exchange.

All in all, *Transend II* is an intelligently designed and implemented telecommunications product that should appeal to both novice and experienced users alike. Its high quality makes *Transend*'s misguided copy protection policy all the more deplorable.

VIDTEX

Compuserve
$39.95
48K; II/II+/IIe

Overall Rating	C	C-	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	D	C-	*Value for Money*

This relatively inexpensive communications package from Compuserve suffers from skimpy documentation. The instructions are much too simplified, and, for the most part, lack clear examples and problem corrections. Compuserve's help line is responsive, but busy.

The program offers some fairly standard features such as a RAM buffer which holds about 10K, number key redefinition for frequently typed commands, "error free" file transfer, and the ability to print out or save files to disk. *Vidtex* requires a Hayes Micromodem II or an Apple Communications Interface card with a different brand of modem.

Printing, saving to disk, file transfer, and so forth is accomplished by means of a META key; a combination of keys which allow on-line access to a menu. The META key for the Apple II and II+ is Control, Shift, P

and the letter of the desired function. On the Apple IIe the META key is Open Apple, ≙, 2 or ≙, @ (sometimes these work and sometimes they don't). Compuserve admits that they are having problems with them.

In order to print with *Vidtex* you must provide an assembly language overlay customized to the printer card slot number. Overlays are provided for Epson, but for other printers you must create your own overlay based on information in your printer manual.

"Error Free" file transfer is effected through a "B" protocol on Compuserve that handles binary, machine specific, and text transfer. "B" protocol is automated on certain Compuserve services such as Microquote. This protocol is built into the Compuserve system and only interfaces with *Vidtex*.

In general, *Vidtex* is a little complicated if you aren't into the technical side of computers. It seems to work best on the earlier Apple IIs interfaced with an Epson printer. IIe users will doubtlessly be frustrated, especially by *Vidtex*'s inability to interface with eighty-column cards. Compuserve subscribers and those willing to spend some time with the software will find the system adequate, however.

ZOOM/MODEM and NETMASTER COMMUNICATION SOFTWARE

Zoom Telephonics
$179.00; $229.00 w/Netmaster
Communications Software
16K; II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	A	*Value for Money*

A modem is a device which allows your computer to communicate with other computers over the telephone lines. A good modem installs and operates easily, transmits information quickly and accurately, and does not cost a fortune. The *Zoom/Modem* fulfills all these requirements, and more.

The unit is a single board which mounts inside the computer. You attach the telephone cord provided into one of the two modular connectors on the modem, then plug the other end into a modular phone jack. You can connect another phone to the other connector on the modem. I installed the whole thing in five minutes, including reading the instructions.

The modem comes with two programs on the modem board itself. This permits you to run the modem without loading additional software from disk. The modem also comes with a simple terminal program on disk, essentially giving you a choice of three ways to operate the modem without buying additional software. This means you can take the *Zoom/Modem* home, use it for a while, and then decide on the features you want from the software.

To use the menu mode on-board software, you hit Control-Reset, and type IN #3 for eighty columns on an Apple IIe, and IN #2 (or whatever slot number your modem is in). The modem presents a simple menu from which you make your selections.

The modem operates at 110 or 300 baud. This refers to the speed at which data is transferred between computers. Many new modems offer 1200 baud, but you should realize that most electronic bulletin boards charge more for 1200 baud access, and 1200 baud modems cost more. Unless you plan to transfer a lot of information, you can very easily get by with 300 baud.

The modem features auto-dial, which simply means you type in the phone number and the modem dials it on either a touch-tone or a rotary dial phone. An on-board speaker lets you hear the call taking place. It also features auto-answer which lets another computer call yours and send information.

Another on-board software program emulates a Hayes Micromodem IIe. If you are familiar with the Hayes commands, which are powerful but more difficult to operate than the Zoom menu-driven style, you can operate this modem exactly like a Hayes. This also means you can use Hayes-compatible communications software—a real plus since Hayes is so popular.

I found the modem an absolute delight to install and use. The price is perfect, too. You simply can't go wrong with this product.

For an additional $50 you can buy the *Netmaster* software. Why buy software at all, you may well ask, when the modem carries its own? For one thing, *Netmaster* will let you store the information you receive on disk, edit it and print it. It stores phone numbers so you don't have to dial them every time. When you configure the program for your computer, you can save the configuration on disk. The program offers two different methods for transferring files from one computer to another: *Netmaster* transmission format and ASCII converted hex format. You use the *Netmaster* format to exchange information with another computer using the same software. The ASCII format lets you trade files with a computer using different software.

Once you have captured the information on disk, you can use the program's editor to insert, delete, and format the text. Since the program creates DOS 3.3 files, you can also use any word processor which uses 3.3 files (such as *Applewriter*). You can also convert the files to ProDOS using a conversion option on the

reverse side of the *Netmaster* disk (which also has the Zoom Communication Software).

The only two drawbacks I detected were that the program would not let you store key combinations (such as log-on procedures) as macros. Some other programs do, but they cost more. The program does not read ProDOS files directly; you have to first convert them to DOS 3.3. If you create files in ProDOS that need to be transmitted, this could prove annoying.

Netmaster is inexpensive, easy to use, and relatively powerful. It will satisfy the needs of ninety percent of all modem users.

As a package, *Zoom/Modem* and *Netmaster* is the best modem-software buy on the market.

ZIP-COMM

Action-Research Northwest
$80.00
48K; II+/IIe/IIc; serial card with modem or modem card; *Zardax* required

Overall Rating	B-	C+	*Reliability*
Ease of Use	C+	C	*Error Handling*
Documentation	B-	B	*Value for Money*

A telecommunications package that interfaces the *Zardax* word processor and your modem, *Zip-Comm* allows you to "talk" to other computers as well as to telecommunications databases. You *must* have *Zardax* in order to run *Zip-Comm*. In addition, unless you already have some experience in telecommunications you may need the help of an experienced friend to take advantage of some of the available options.

As they did with *Zardax*, the people at Action-Research Northwest have gone to great pains to provide many practical examples and an exhaustive bibliography on telecommunications. This alone should tell you how much you must learn to master the subject. The bibliography includes the addresses of numerous time-sharing and telecommunications groups. The actual implementation of the package looks fairly simple, but it took me quite a while to get the program up and running. I attribute much of this to the fact that I had a newly installed serial card and modem, but the rest was due to incomplete instructions. I would like to see examples of how the screen should look after a successful setup. I'd also like a troubleshooting guide to help me work through problems such as those I found. You install the software much as you do *Zardax*, booting up *Zip-Comm* in drive A (I have two drives) and answer a few questions, such as the type of serial card you've installed. The system then writes the *Zip-Comm* code onto the *Zardax* disk. I had one question at this point: Must you install *Zip-Comm* on the *Zardax* working disk? Usually you store all your working files on those disks. However, the instructions don't mention this point.

The program uses three inner menu commands to put the Apple into terminal mode or modem mode or to restore output to the printer. I attempted to use both the terminal and modem modes only to find that a lack of examples hampered my learning. For example, I couldn't quickly resolve the problem of accessing my modem and dialing an outside computer.

Overall, I thought *Zip-Comm* a welcome addition to the *Zardax* family. With a minimal investment in these two software packages, you can perform word processing and telecommunications using an Apple II with minimal extra hardware. The software dependence constitutes a significant problem simply because other communications software works independently and allows data file transfer. This dependence may well prove a disadvantage to *Zip-Comm*.

Accounting

ACCOUNTS PAYABLE

BPI Systems, Inc.
$395.00
48K; Apple II/II+/IIe/III in emulation mode ($495.00)

Overall Rating	A	A-	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A	*Value for Money*

The BPI *Accounts Payable* program will keep track of expenses and cash outlays for a variety of businesses. It can be used by itself or will interface with the BPI *General Ledger* system. The software package consists of five disks: Vouchers (Invoices), Checks (Disbursements), Entry Posting, Maintenace, and a sample data disk. The system is copy-protected, but an extra disk set can be purchased from BPI for $40.00 BPI will repair or replace a damaged disk for $10.00

Accounts Payable requires a two disk system—one drive for the program disk and the second for the data disk. In this configuration, the program can manage ten checking accounts making payments on up to 1,000 vouchers. The system can record expenses and disbursements in 350 general ledger accounts involving purchases from as many as 250 different vendors.

The program documentation is extensive and includes a tutorial sequence for every function of the program. There is a full chapter devoted to problem solving, a complete listing of error messages, and a large glossary of terms. An appendix contains examples of printed output and a set of blank worksheets help you configure the system to the particular needs of your business.

The *Accounts Payable* system is menu-driven and includes a command queue feature to sequence several commands through the system without your interaction. This time saving feature is helpful because the price you pay for the myriad of user-friendly features is response time. The system is very slow (20-40 seconds) between program tasks when returning to the Main Menus and when updating system records. The software format is highly standardized and all program disks utilize common commands. During program operation, all control characters that can be used at any particular time are displayed at the bottom of the screen with a short definition of each. This prevents you from having to refer back to the manual during program operation.

Accounts Payable keeps records for both accrual and cash accounting methods, and can automatically record periodic disbursements (rent, lease payments, installment loans, etc). The program will produce reports on every area of payables recordkeeping: Accounts Payable Ledger, Check Register, Vendor Files and Ledgers, Voucher Register, Report of Invoices by Age, and even a Cash Requirements Report for cash flow analysis. The program will also print disbursement checks on appropriate check forms.

ACCOUNTS RECEIVABLE

BPI Systems, Inc.
$395.00
48K; Apple II/II+/IIe/III in emulation mode ($495.00)

Overall Rating	B+	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	B+	*Value for Money*

BPI Systems Inc. manufactured *Accounts Receivable* for use by small businesses. To operate this system you need an Apple II with 48K, two disk drives, and a printer capable of at least seventy-two columns. Unfortunately, the program seems to best suit a Centronics Printer although the Equipment Required List does not specify this. My printer, a Paper Tiger, could not produce the hard copy listings.

The program consists of three disks: a Data Entry Disk, a Reports Disk, and a Maintenance Disk. A fourth disk contains a complete set of accounts with balances forward so that you can practice entries. The system comes with a protection device that you must plug into the game paddle I/O socket to run the program. A very nasty thing happens should you try to run the program

without this device: the data disk in drive two gets completely erased. This happens because the disk gets initialized, so when the system invokes New, the program on the disk in drive one is deleted.

Accounts Receivable is a complete, almost automatic command execution system for this type of data entry. Almost all commands are issued so that as many as eight different commands can be executed in sequence without further user input. The program includes an Invoice Register, Cash Receipts Journal, and General Journal, which has a skeleton General Ledger that you can tie into the *General Ledger System* (also by BPI). After posting to the skeleton General Ledger, all accounts can be transferred to the *BPI General Ledger* system automatically.

The Reports Disk prints up to sixteen different reports at your option any time during the accounting month. Since the program is not intended for billing, the option was not included and it will not print invoices. Statements are printed in one of two ways, either with balance forward or with open items. You make that choice when you generate the system.

The Maintenance Disk sets up all necessary accounts on the data disk, including the skeleton General Ledger. This system handles 500 accounts and 1,000 transactions per month without too much trouble. If a data disk becomes full during the month, the screen displays instructions for creating two or more disks to handle the volume.

The manual is well written and covers almost every phase necessary to get the package up and running. One important feature incorporated in the entry routine allows you to correct any error entered by using the backspace key.

Although not inexpensive, this well-designed program fulfills its purpose admirably. I would like to see the option of a billing program to produce invoices to tie into the receivables program, because most of us do need such a capability in a program.

THE COMPUTER PROGRAMMED ACCOUNTANT (CPA) GENERAL LEDGER, ACCOUNTS RECEIVABLE, ACCOUNTS PAYABLE, PAYROLL

Arrays, Inc./Continental Software
$250.00 each for General Ledger,
Accounts Receivable, and Accounts Payable
$495.00 for Payroll
48K; Apple II/II+/IIe

General Ledger

Any General Ledger, by its very nature, can be complicated to implement. This is extremely true if the intended user is not an accountant, and perhaps is also new to computers. It is therefore extremely important that a General Ledger program meant to be used by the non-accountant be as easy to use as possible, and at the same time be powerful enough to provide quick, accurate, and meaningful information to the user. It is equally important that the program provide the user's accountant with accurate, concise figures derived from established accounting principles with verifiable audit trails.

Arrays, Inc./Continental Software has done a good job in achieving these objectives in the General Ledger portion of its *CPA* program.

Features:

A) The program comes with a complete chart of accounts that can be used as is, or modified for the user's specifications. The user may also design a custom chart of accounts by using the pre-printed form that accompanies the package.

B) Data entry is easily accommodated, since the user is again provided with a form for that purpose, and the program itself checks that everything is in balance before allowing posting.

C) The program generates well-designed and readable reports:

1) Profit and Loss Statement
2) Trial Balance
3) Balance Sheet
4) Complete Journal Activity Report

D) A unique feature provided is that data in any account may be graphed and displayed on the screen.

Specifications:

1) 120 accounts in the Chart of Accounts
2) Approximately 1,000 transactions per month
3) Provides current year versus previous year figures
4) Maintains approximately a single year's history (depending on number of monthly transactions)

Accounts Receivable

First things first. In this module, the user is able to print invoices. In the past, this reviewer has found it somewhat surprising that in all the Accounts Receivable programs encountered for the Apple, they only allowed statement printing—no invoicing. I realize that businesses differ in operation but I'm sure that many small businesses are similar to mine (computer supplies) in that I use invoicing almost exclusively, and send statements only as a backup or as a prompter for overdue accounts. In any event, with this program you can do both.

Invoices and credit memos may be carried on an open item or balance forward basis, and can be shown either way when statements are printed. There are several options for printing statements, such as by selected customer or only those with overdue balances.

Another seldom found but nice feature involving this module is the fact that you have the option of printing your invoices and statements on either blank computer paper (as in most programs) or on pre-printed, three-part carbonless forms (available from Arrays, Inc./Continental Software).

An interesting touch is the way the user can define what constitutes column headings on a computer—a simulated manual journal. Sales categories—up to four—may be defined for the Sales Journal, and sources of cash—up to five—may be defined for the Cash Receipts Journal. This allows income and cash to be "spread" among several accounts if necessary. Thus, the user may allocate sales as needed.

Both the summary Aging Report and the detailed Aging Report are well designed, with an individual's name and phone number included for quick follow-up on overdue accounts.

The other reports generated by this package include a sales report showing the month's and year-to-date sales and last date of sale, Journal Reports, Customer Lists and Labels, and a General Ledger Posting Report.

Accounts Payable

In most respects, this module operates just like Accounts Receivable in reverse.

The module prints checks and allows you to mark which invoices you want to pay. It will print an Aging Report and a Cash Requirements Report.

Again, the journals, in this case Purchases and Cash Disbursements, may be customized by the user to spread transactions.

Payroll

Arrays, Inc./Continental Software's Payroll module provides the user with an easy-to-use method of keeping track of employee records as required by federal, state, and local law for all fifty states and the District of Columbia.

Complete Personnel Files are maintained for all employees.

A nice feature of this module is that the federal tax tables as well as the user's unemployment tax rate, FICA rate and limit and local payroll tax rates may be changed at any time by the user. When the payroll tax rates and/or limits change, most programs will not correct the previous amounts already deducted. This program will.

When it comes time to enter payroll data to generate checks, employees may be called up by name, pay period, or department. The Payroll Journal may be printed totally, by pay period, or by department.

When checks are printed, the employees' personnel files are automatically updated to reflect the current quarter and year-to-date totals.

Information for Form 941 and W-2 forms may be generated as well as Form DE-3 for California users.

A tax table update service is available for an additional charge of fifty dollars per year. Arrays, Inc./Continental Software will mail additional tax data disks as required to subscribers of this service, along with a utility program that prompts the user as to how to update federal and/or state tax tables as needed.

Note: Arrays, Inc./Continental Software has produced a set of audio tapes and a demonstration disk for its accounting modules. This demo package might be a good way for you to check out the suitability of these programs at a nominal cost.

EXPENSE ACCOUNT MANAGER

Adaptive Software
$89.00
48K; II+/IIe/IIc/III in emulation mode

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

Expense Account Manager lets you print out expense statements and reports based on information you enter about business expenses. The menu-driven program walks you through a string of expense categories, asking you to fill in the blanks. It not only covers almost every expense category you could think of, but offers plenty of flexibility in defining your own. You can code expenses, add or delete categories, automatically include mileage factors, and much more. You can get statements, reports (of statements), budget reconciliations, even a DIF formatted statement file for spreadsheet access. Documentation is clear and concise.

The manufacturer pitches this product to both individual professionals and company employees. I think the former group would be much better served by *Expense Account Manager* than the latter. Traditional expense report forms often take only one page, which means that although they are tedious to fill in, you can see the whole picture at a glance. By contrast, this program takes three pages to print out a simple statement. Furthermore, many companies require a standardized format. You might use this program as an intermediate stage in such cases, but who wants to fill out the same expense report twice?

I do think that independents and small businesses could make good use of the program in general, and the coded reporting structure in particular, especially when coding information over the long run for tax purposes.

FINANCIAL PACKAGE

Computer Asset Management, Inc.
$39.95
48K; Apple II+/IIe

Overall Rating	C	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	C	*Value for Money*

Financial Package includes a series of programs to perform calculations common in personal financial planning. The typical program asks you to enter values for parameters, then applies an appropriate formula to create a table of data based upon the parameters. You can readily convert the nicely formatted tables to hard copy for future use.

Inflation Projection shows how inflation will eat away the purchasing power of a fixed income. *I.R.A. Projection* compares tax deferred investments to the more common kind. *Real Estate Programs* provides a collection of programs. One shows how income tax deductions, taxes, and appreciation affect the cost of owning a home. Another calculates the accelerated and straight line depreciation allowable to taxpayers under 1981 laws. A program on personal loans allows you to enter interest rate, number of years, and loan amount; the program then produces an amortization schedule. *The Retirement Planner* calculates monthly retirement income and expected annual return on investments. A series called *Stock & Bond Programs* includes programs to compute current bond value, compare taxable and tax-free yields, calculate current yield or yield to maturity, and record gain/loss on stock transactions. The *Time Value of Money Programs* calculate compound interest, the internal rate of return of an investment with cash flow, and the present value of an amount receivable at some future date with or without cash flow.

The authors target professional financial planners and individual investors. A professional planner could use the series for demonstration purposes, generating an impressive table of information as a first step in decision-making after asking the client a few key questions. However, the professional would need more powerful tools for anything beyond demonstration. For example, the capital gain/loss program should record all information required by the IRS, such as dates of purchase and sale, and should total multiple transactions. Likewise, the loan tables should include yearly subtotals for tax purposes. Individual investors also encounter some limitations. They would never use many of the programs, while others could mislead a person lacking financial sophistication into making a wrong decision. An introductory book or a visit to a financial planner would be a better first investment.

This simple-to-use package is so user-friendly that you rarely need to refer to the twenty-six page manual. The copy-protected disk does offer a backup, but according to the documentation an updated version will cost $10 when it comes out.

GENERAL ACCOUNTING

BPI Systems
$395.00
48K, Apple II/II+; 64K, Apple IIe; 256K, Apple III in emulation mode ($495.00); *Profile*

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B+	*Value for Money*

Have I got a deal for you. Are you involved in a business that needs a good general accounting system? If so, then how about adopting an accounting program that incorporates all those specialized accounting functions into one nicely made package. If this idea interests you, please read on.

General Accounting has combined the general ledger, accounts receivable, accounts payable, cash disbursement, and payroll functions in one handy software package. These functions are accessed through five different disks. A start-up disk, as in most ProDOS programs, is used to load and set up the accounting system. The Posting, Data Entry, and Maintenance disks do exactly what they say. The last disk, called the Corner Home Improvement Center, is a data disk containing a fictitious company's books.

Because this program tries to do so much, combining into one package all of the most commonly used accounting ledgers, you may well wonder for what size business it is appropriate. Most small to medium-size businesses could use *General Accounting* to handle all their accounting functions. But I would not recommend this system for a large corporation, and certainly not for a major accounting firm. Also note that there is a definite outer limit to the software that makes it impossible for corporations with transactions that total over $999,999,999.99 per year to use this system.

Like most accounting programs, *General Accounting* is programmed in BASIC; this causes it to make calculations slowly, especially when it is sorting. But the pace picks up if you are making data entries, accessing a disk, or performing other general-use functions. In fact, you would be hard pressed to enter information faster than the program can handle it.

To use *General Accounting* you'll need a printer and a minimum of two disk drives. If you have a numeric keypad and either an extended storage device, such as a hard disk or double-sided, double-density data drive, the system will work even better. Although the system is designed to work with two disk drives, the documentation includes set-up instructions for the Apple Profile hard disk. If you can afford it, that is the way to go. Information can be displayed on your screen or printed out, but you must first install the system for your printer.

The manual is very well-designed; it goes into extensive detail on the workings of the program and the use of Apple ProDOS. Instruction is given on making and using back-up copies of the disks. You are taken step-by-step through the initial set up and data entry for the Corner Home Improvement Center. When you are finished with this tutorial section, you are taught how to set up books specifically for your company. A selection of blank worksheets assists you in doing everything from the intial set up of the printer to a listing of your companies standard entries. This alone will save you much time and trouble. Athough some user experience in accounting is almost mandatory, the manual tries to make everything as easy as possible. A glossary helps with accounting terms.

The program is extremely well error-trapped. I tried everything I could think of to bring down the system, but nothing worked. This quality makes the system perfect for inexperienced operators or for businesses that use multiple operators. Unless you hit Ctrl-Reset, there is probably no way that you can get into trouble.

General Accounting is unquestionably worth the $400.00 price tag.

GENERAL LEDGER

BPI Systems, Inc.
$395.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	A-	*Value for Money*

The *General Ledger Accounting System* by BPI Systems Inc. of Austin, Texas, makes up a complete accounting system for an Apple II 48K with ROM card, two disk drives, and a printer capable of printing at least seventy-two columns. You should interface the printer with either the Apple high-speed serial card or the Apple parallel printer interface card. The package contains four disks and a comprehensive manual which takes the first-time user through all the steps necessary to implement the system. The fourth disk (a data disk) has a sample business entered on it so that you can practice. The three main disks are the Data Entry Disk, the Posting Disk, and the Maintenance Disk.

The main feature of this program is its ability to run multiple comands with automatic execution of the commands selected by use of a Queue. You can enter data disks only with an identifying code made up of six characters. This allows different companies to use the system by changing the Data Disk and accessing with the proper code. The system also includes a General Journal which can access any account in the General Ledger or any subsidiary ledger. Also important is the ease of correcting input errors. The back-space key erases any error, or you can use the General Journal by entering a journal entry with a matching offsetting entry to correct an entry made to the account after it was posted. This works just as a set of books kept manually does.

The Data Entry Disk has all the commands for entering data to the various journals in the system and the commands for printing the journals, posting the ledgers, preparing financial statements, and closing books. This occurs automatically with the use of the Queue commands.

The Posting Disk includes the commands necessary for posting all entries to the various ledgers after sorting them by account number. After the General Ledger is sorted, it is printed automatically or shown on the screen if the printer has not been turned on. After the General Ledger is printed, all subsidiary ledgers are also printed, including the payroll ledger. You can execute the Post command any number of times during the month before running the end-of-month command (a nice feature). You can also generate a profit and loss statement at any time, as well as a balance sheet.

The Maintenance Disk helps you open a new set of books and set up a new chart of accounts. When you set

up the chart of accounts, changing the last digit of the account number produces multiple profit and loss statements for different departments, stores, or branches. This disk is used to initialize the Data Disk used for that particular operation. The Create Accounts command on this disk opens up a list of subcommands which allow you to create a general ledger, a payroll ledger, an accounts receivable ledger, an accounts payable ledger, cash disbursement prompts, invoice register prompts, merchandise purchased journal prompts, cash journal prompts, and store configuration.

All in all, this program has been well thought out, and excellently documented and executed. I found no errors in testing the entire program. This complete, integrated system contains superior features found only in very large computing systems. Any small or professional business will find the program very useful. The system handles up to 400 General Ledger accounts, 100 Payroll accounts, 200 Accounts Payable accounts, 400 Accounts Receivable accounts (which can be expanded), and 200 Cash Disbursement accounts.

THE HOME ACCOUNTANT

Arrays, Inc./Continental Software
$74.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	A	A	*Value for Money*

The *Home Accountant* is one of the most comprehensive home financial programs available. It is also one of the most popular, remaining a best seller since its introduction two years ago. It is compatible with a wide range of printers, and it can be set up for several system configurations (but not hard disks). The documentation is extensive and well written. To set up the system, just follow the examples presented. You do not need to know a particular accounting system, or be an expert accountant yourself.

You select one of the ten modules of the program through a Main Menu. One of the first steps in setting up the system is to choose a budget category. Up to 100 categories are allowed. All budget categories are allocated into five broad areas: assets, credit cards, liabilities, income, and expenses. You can enter a maximum of nine digits in any dollar amount per transaction, with a maximum of ten digits in any totals column.

The system will keep track of five checkbooks. Entries into the checkbook accounts can be divided into any of the established categories. For example, you can divide a loan payment into principal and interest, or a paycheck deposit into tax, retirement, and dues. When you enter checks, the program assumes they have not cleared the bank. After you receive a bank statement, you indicate to the program which checks have cleared and it completes the reconciliation. You can also print checks, but you must purchase special formatted checks for this purpose.

The Home Accountant offers extensive search and edit capabilities. You can search through entries from the checkbook, cash account, or credit card accounts. The search criteria offers a combination of information (for instance, date, check number, or amount). When the search matches up to the information you want, it is presented on the screen for editing. You can also interface the program with Continental's *Tax Advantage* program, flagging relevant income and expense entries for later transfer into the tax preparation program. This saves you the bother of rekeying much data when it comes time to do your taxes.

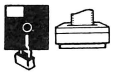
The graphics module is good. You can select any category for a graph, and you can compare both expenditures and budgeted amounts. Presentations, on screen only, can be in the form of bar, line, or trend analysis graphs. If you need copies, you must save the graph on a separate disk and print it using a program other than *The Home Accountant*.

Extensive reports are available. For example, you can produce reports by category with budgeted and actual amounts. Other choices include a personal balance sheet summarizing assets and liabilities, or net worth statements. These summarize from one month up to twelve. A summary of all entries can be printed, or you can specify search criteria to limit the number of entries. For example, you can print a list of all checks written that are tax deductible, or print all entries to a credit card. A printer capable of 132-column print is required for some reports. The reports cannot be printed on the screen for examination. Therefore, if you just want to browse through some categories, you can use a lot of paper in a short time.

Three options allow for some future financial planning. These include calculation of the value of an investment in the future, monthly amounts for a future goal, and projected budget planning with inflation taken into account. Output is in the form of tables and graphs.

Arrays, Inc. wants you to be satisfied with the program. The warranty states that they can make changes without notice, but you can enroll in the software support group at a nominal fee and thus be kept up-to-date at all times. A phone call to the customer support group

is always helpful. If you want a home financial program, I recommend that you consider buying *The Home Accountant*. Some programs offer different features, but few are as comprehensive.



JOB COST

BPI Systems, Inc.
$595.00
48K; II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A	*Value for Money*

Job Cost is a comprehensive system for the small to medium-sized contractor or job-oriented business. It can be used by itself or can interface with the BPI *General Ledger* and *Payroll* systems. The software package consists of five disks: Data Entry, Reports, Entry Posting, Maintenance, and a sample data disk.

Job Cost requires a two disk system—one drive for the program disk and the second for the data disk. It can manage 200 jobs consisting of up to 2,000 accounts and purchases from 200 different vendors. The program documentation is extensive and includes a tutorial sequence for every function of the program. There is a full chapter devoted to problem solving, a complete listing of error messages, and a large glossary of terms.

The program is menu-driven and includes a command queue feature to sequence several commands through the system without your interaction. This time saving feature is helpful because the price you pay for the myriad of user-friendly features is response time. The system is very slow (20-40 seconds) between program tasks when returning to the main menus and when updating system records. The software format is highly standarized and all program disks utilize common commands. During program operation, all control characters are displayed at the bottom of the screen with a short definition of each. This prevents you from having to refer back to the manual during program operation.

Job Cost keeps a record of both income and expenses for each job—including any amounts retained by a client as a performance bond. This information is used to generate a Profit/Loss statement for each job, and a cost analysis summary. The program will also handle inventory transfers for use of "on hand" materials or for shifting materials between jobs. If you enter standarized costs for various work units (roofing labor hours, cubic yards of concrete, linear feet of lumber, etc.) the system will automatically calculate cost and price extensions.

Job Cost will produce reports on job status based on costs-to-date information. You enter the estimated percent complete for each job task and the program develops a complete analysis of current costs versus the cost of the completed job. The program will also produce job estimates for use in bidding on work or in negotiating final prices.

MONEY STREET

Computer Tax Service
$99.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	D	*Value for Money*

Money Street does what you would expect a checking account program to do: it keeps track of the money. No need to be an accountant with a tax practice to run this program. It operates like your checkbook does, only it provides a great many more functions. *Money Street* instantly answers questions about your bank balance, which checks haven't cleared, or how much you've spent in each budget category. In addition, it will produce a number of reports. One welcome feature of this program is that its formats contain nothing new—no surprises; nothing to learn; the territory is completely familiar.

The first step is to set up some spending categories; there can be up to a hundred of these, such as rent, car, food, and so on. The categories can be grouped and subtotaled. Pressing Control-O at any time during the program will produce a list of these categories and the amount spent in each. Next, we move to the checkbook. The screen is set up exactly like your check entries: check number, date, payee, category, and amount. Row after row, a line for each check entry appears just like your checkbook. The balance is always displayed, as is the balance for the category of the last check. Hit Control-O and you can instantly toggle between your current check entries and your balance by category (a very handy feature). Reconciling the bank statement is easy as well. Simply enter the check numbers that have cleared the bank, and tick them off as they appear on the screen for verification. Any mistakes made on entry can be easily corrected. In addition, there are no monthly closings which can make records inaccessible. There is a constant running total of 100 categories, the account balance, and 2400

checks. *Money Street* can handle a list of unreconciled checks of up to 200. That's probably enough for most users for at least a year. Finally, you are left with 15 reports that will provide the status of your account for any time, category, check number, payee, and so on. It produces reports and summaries of each reconciliation, and will give trial reconciliation reports in case the bank and you disagree. (*Money Street* will interface with most printers.)

A utility disk is offered with the package for $25.00. My advice is to buy it. The utility disk will allow you to make two copies of the *Money Street* master disk. It also allows some additional sorts of your checkbook data that are not available on the master. There are, however, other copyable programs with more features that cost less than *Money Street*.

The documentation, like the program, is first rate. It provides a tutorial with sample entries. There is no documentation accompanying the utility disk; however, there are sufficient instructions on the disk to use it properly. Overall, this is a user friendly program that fulfills its intentions and manages a checkbook.

THE MONEY TOOL

Howard W. Sams & Co., Inc.
$59.95
48K; Apple II/II+/IIe

Overall Rating	B+	B+	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	B-	B+	*Value for Money*

The Money Tool is a series of money management programs for financial recordkeeping, checkbook maintenance, and budget management. It can carry up to 12 checkbooks with 500 transactions each per year, with up to 120 user-defined deposit/expense categories per checkbook. It will provide a complete transaction report on a limit of 500 transactions. Up to 900 transactions may be summarized in other reports, and summaries of data are available with no limit on time period or number of transactions. All reports are tabular, i.e., there is no provision for any charting or graphing (nor will it print checks). *The Money Tool* also provides for checkbook/bank reconciliation. Another feature is a budget spreadsheet for each deposit/expense category on a daily, weekly, monthly, and yearly basis. It also enters reserve allocations, and reports the activity against these allocations. However, there is no direct comparison report of budget vs. actual by category. It will generate a transaction report using the same deposit/expense categories, showing total and average daily charges for the period. Categories can be combined in summary reports, so that all cash expenditures could be accumulated and presented as a single line item, for example.

The program makes extensive use of menus, with the Main Menu containing the following sub-menus: Enter Transactions, Revise Transactions, Display Transaction Report, Print Transaction Report, Save Checkbook No. "XX" File, Rename Categories, List Uncleared Checks, Summary Report, Budget, File Selector, Initialization, and Exit. Each sub-menu contains multiple selections as well, so that any part of the program can be accessed with just a few keystrokes. Entries for dollar amounts can either be in dollars only, or dollars and cents. *The Money Tool* always adds trailing zeros and prints whole dollar amounts in vertically aligned columns. Escape routes are provided for almost every entry by pressing the Escape key. Invalid entries are rejected.

Transaction entry is the key to *The Money Tool*, as all of the other features use the data entered into the various deposit/expense categories. *The Money Tool* initially assists you by providing recommended titles for most of the category code numbers. These can be changed, deleted, moved around, or new titles added as you wish. Entering the category code number (01-99, AA-AU) takes you to a transaction menu where you will enter the dollar value of the transaction. The program uses default entries for check No. 1 on January 1st of the current year. If it is not a check transaction, or if you are starting at any other time than the first of the year with a check number other than No. 1, you have the opportunity to make the appropriate revisions. A key item missing from the transaction entry is the ability to code the transaction for tax purposes. A partial solution would be to set up deductible and non-deductible categories. Also missing is an automatic payment feature that would facilitate the handling of recurring transactions like rent or mortgage payments.

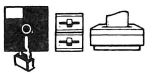
The program has extensive editing capabilities and will permit you to revise any entry, add entries by opening space between previous (existing) entries, and delete entries, all with a minimum number of keystrokes.

The main program is copy-protected, though the data files can be transferred to another disk. If you have two drives, it is recommended that all data files be placed on a blank disk in drive 2.

The manual is 67 pages long and consists of two parts: a 16-page tutorial, and a detailed description of program operation, features, and reports. The tutorial is not as complete as it should be. You must read the entire manual to have a clear understanding of program operation. Also, the tutorial makes reference to abbreviations that are not explained until much later in

the manual. Both the manual and the disk come packaged in an attractive binder.

In summary, though it lacks some features, *The Money Tool's* ability to keep accurate and extensive records of your income and expenses, coupled with its reasonable price, definitely make it a program worth buying.



NETWORTH

Scarborough Systems
$79.95
64K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	C	C-	*Error Handling*
Documentation	B	C	*Value for Money*

This is yet another checkbook management system. In an already crowded field, a new program has to be exceptional to stand out. This has some nice features, but on the whole, it is just average.

It comes with a program disk, a sample data disk, a 130-page manual, a digest of Sylvia Porter's *New Money Book for the 80's*, and a reference card. The program disk is copy-protected, so you can't make a backup. There is a thirty-day guarantee; after that you can replace a damaged disk for $5, but there is no way to buy another disk at a discounted price.

You can create 420 accounts, classified as Income, Expense, Liability, Asset, and Credit Card. There are only a fixed number of accounts within each category, which makes the classification system less flexible. You can use either your own account categories or the ones provided on the sample disk. These sample categories might be useful for someone starting their own budget, but most of us will already know which categories we need. You can add new accounts at any time and you can't delete an account if it contains any information—a common safety device on these programs.

After you set up the accounts, you enter your financial information. The record entry function is simple, but correcting errors is awkward. In fact, once you have posted the entries, you can only make a correction by entering a "reversing entry." There are other programs (most notably *Dollars and $ense* and *The Home Accountant*) which are easier. Another awkward feature is that you have to divide your entries into Deposits, Payments, Credit Card purchases, Credit Card payments, Loans, and Transfers. This means that if you sit down with your checkbook once a month to enter the information, as many people do, you will have to move around several menus. Other programs let you make different entires on the same screen. The entries are presented one at a time, which slows down processing. I prefer a one-line entry approach, which can most practically be done with an eighty-column card. This program does not make use of an existing eighty-column card.

Every once in a while you will have to post your entries from the Journals to the History file. This is easy, but correcting mistakes becomes very difficult after posting. I prefer a system where any entry is available for correction, even one made several months before.

Like most other programs of this ilk, it prepares an Income Statement and a Balance Sheet; it doesn't let you make charts and graphs (as do both *Dollars and $ense* and *The Home Accountant*). And while it will prepare lists of each account, it won't let you search for individual entries.

Three other modules are available. The first is a tax record which keeps a list of all tax-item entries; the second is a personal property list of up to 250 items; the third is a stock portfolio. While the stock portfolio is very easy to use, it doesn't have a field for dates, which means you can't compute long- and short-term gains, or even know when you made your last entry. It is too incomplete to be considered a real feature; it's more like sloppy icing on an already lop-sided cake.

The most serious problem with the program is that it is totally memory based. That means the entire program, as well as your data, is placed into memory each time the program is loaded. That's why it takes about sixty seconds just to load the program without the data. This also means that you must reconcile and post entries as often as possible, because they are cleared from memory. You are encouraged to keep your personal property and stock records on a separate disk from your accounts. The documentation also warns that if you run out of room you should pare the number of your records down to something more manageable. Since I happen to think that one of the advantages of keeping records on a computer is being able to keep large chunks of information in one file, this warning suggests that the programmers did not make full use of the increased memory of the IIe/IIc. The memory limitations of less efficient programs is one of the reasons that many users upgraded to 128K machines. We should be able to buy programs that utilize this extra power.

To sum up, this program is best suited to the Apple II+ owner who wants ease of use, does not have very complicated requirements, and wants portfolio record-keeping and property records in one program.

PAYROLL

BPI Systems, Inc.
$395.00
48K; II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A-	*Value for Money*

Payroll will manage a complete payroll—including taxes and withholding—for businesses with up to 9,800 employees. It can be used by itself or will interface with BPI's *General Ledger* and *Job Cost* programs.

The software package consists of five disks: Data Entry, Entry Posting, Maintenance, Tax Tables, and a sample data disk. The system is copy-protected, but an extra disk set can be purchased from BPI for $40.00. BPI will repair or replace a damaged disk for $10.00. The system has been thoroughly tested by a CPA for reliability and accuracy, and when you register the software with BPI, a disk containing the latest tax tables for your state is forwarded to you with the system.

Payroll requires a two disk system—one drive for the program disk and the second for the data disk. *Payroll* can keep pay records for up to 9,800-plus employees and a $9 million payroll. Pay records can involve up to 99 general ledger accounts and 100,000 journal entries. The program will manage pay records calculated on a salary, per hour, or commission basis and will make deductions from each employee's pay according to individualized instructions for that employee.

The program documentation is extensive and includes a tutorial sequence for every function of the program. There is a full chapter devoted to problem solving, a complete listing of error messages and a large glossary of terms. One appendix contains examples of printed output and a set of blank worksheets that help you configure the system to your particular needs.

Payroll is menu-driven and includes a command queue feature to sequence several commands through the system without your interaction. This time saving feature is helpful because the price you pay for the myriad of user-friendly features is response time. The system is very slow (20-40 seconds) between program tasks when returning to the main menus and when updating system records. The software format is highly standardized and all program disks utilize common commands. During program operation, all control characters are displayed at the bottom of the screen with a short definition of each. This prevents you from having to refer back to the manual during program operation.

Payroll will produce a variety of pay-related reports: Payroll Register, Check Register, Pay Statements and Earnings Records, General Journal, W-2 Forms, and a Tax Information Report to make end of the year calculations easier. The program will also print payroll checks on appropriate check forms and BPI has a suggested form they market separately.

SUP'R LEDGER

M&R Enterprises
$295.00
48K; II; language card, 80-column card

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	B	A	*Value for Money*

Sup'r Ledger is a no frills, hard hitting, down to earth General Ledger accounting system. Most of the rather drab menus and prompts within the program lack visual appeal, but they are efficient and to the point. The program handles small- to medium-sized businesses with up to 1,400 transactions per accounting period, 200 different accounts, and up to ten cost centers. You have an option to set up budgets for each account and can review the results on the budget income statement which has the current period and year-to-date comparisons.

The program consists of five disks, all easily backed up using the standard DOS 3.3 COPYA routine. The disks include the Master Program Disk, Report Program Disk, Master Company Disk, Budget Program Disk, and Sample Company Data Disk. You copy the Master Company Disk to use as the data disk for your company. Although the program menus sometimes refer to the Master Program Disk as the "Maintenance Disk," don't let that confuse you. Disk swapping is not a major problem.

Sup'r Ledger generates outstanding reports. They include: Trial Balance, Balance Sheet, Income Statement, Income Statement (year-to-date), General Ledger (current), General Ledger (year-to-date), Journal Source, Chart of Accounts, Budget Report (formatted), Budget Income Statement, Budget Report, and Budget Worksheet. The well thought out reports fall within the guidelines of generally accepted accounting practices.

Since the program was designed primarily for business use, it assumes that you know something about accounting. The manual recommends that you work with an accountant to set up the program. I agree. However, once set up, the program requires only enough accounting knowledge for you to tell the difference between a debit and a credit. Probably the most confusing area is understanding the "Totalizing Registers" and their relationship to the Chart of Accounts. Once you understand the logic behind them, the task becomes much easier.

The brief manual lacks detailed explanations or examples, again primarily concerning the set up phase. You should also watch for a couple of minor errors and inconsistencies. In particular, you use a number of commands to exit different sections. I discussed the problem with M&R Enterprises at one point and learned that they plan to update their manual to correct this.

Another area to watch for involves printers with serial cards. *Sup'r Ledger* has a built-in routine that looks for the serial interface card at the beginning of the program. If it finds a serial card, it sends a null command to the printer and waits for the printer's response. If the printer happens to be off, the program locks up. Even with the printer on, the null command sometimes causes the printer to show a data error, which requires a reset command. If you have a parallel interface card, you won't face this problem.

All in all, *Sup'r Ledger* is a powerful accounting tool for small- to medium-sized businesses that provides detailed financial reports with a minimum of effort.

TIME IS MONEY

Turning Point Software
$100.00
48K; II/II+/IIe/IIc, Franklin,
optional 80-column card, interface card

Overall Rating	B+	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	B+	*Value for Money*

Time is Money requires no training in accounting. A complete personal financial management system, it helps you balance your checkbook(s), calculate and monitor budgets, calculate your net worth, record tax deductible expenses, and even print your checks. You can adjust the program to handle more complex business endeavors rather than simple personal check auditing, but it does not substitute for business-oriented software. You can print out full reports on any type of printer and graphic reports on a wide variety of printers as well as onscreen. The program also has the flexibility to do only what you want it to rather than forcing you to employ every feature.

I found the program straightforward and simple to install. The manual begins with an easy tutorial that leads you through setting up the system and entering your own transactions. You can track 240 Income Types, 240 Income Sources, 240 Expense Types, and 240 Assets and Liabilities, all on a single disk. You can add to or change any account at any time. Accounts have their own names, not numbers. The system's capacity depends on your computer's memory rather than your disk drive capacity. The program takes advantage of extended memory and works very quickly.

A short transaction entry menu allows you to place remarks in the entry as well as more extensive information about who you wrote the check to or where the income came from. Transactions consist of checks you write (or the program prints), deposits, refunds, or transfers between accounts. This system helps you develop budgets for future expenditures or a cash flow analysis of your personal, or small business, finances. The tax multiplier in the expense categories allows you to determine the deductible percentage of an expense (such as 10% of home expense for a home office). Other features include printing checks; creating graphs of income, expenses, and profits; and creating groups and budgets. Most of these extra items allow you to create budgets based on previous income/expense accounts. The use of groups allows you to consolidate transactions from similar accounts, such as putting mortgage payments, electricity, and real estate taxes into one group to deduct the costs of a home office.

Operating the system is quite simple, performed through menu selections by pressing just one key. You can also call up a Help screen with one keypress. I found only one drawback: the lack of latitude dictated by memory requirements. You can set up as many as 240 accounts of each category, but you can have only nine groups or budgets and nine definitions of net worth if you have a 48K system. I recommend increasing your Apple's memory to 64K to take full advantage of the program's capabilities.

The program disk, although not copyable, is used only to create a working disk which has its own backup utility. You usually need to create a new working disk only once a year. I found *Time is Money* a pleasure to use, with incredible speed of transaction entry and generation of reports. If you begin shopping around for a personal or small business accounting package, be sure to get a demonstration of *Time is Money* before making your final decision.

VERSAPAYABLES

H & E Computronics, Inc.
$99.95
48K; II/II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	C+	*Value for Money*

VersaPayables is virtually a mirror image of *VersaReceivables*. It, too, is designed to interface with *VersaLedger II* and offers a complete accounts payable system which will print checks and check registers, allow for full or partial payments, and print vendor mailing lists and all commonly used accounts payable reports. The program will keep track of discounts and will automatically select and pay the vouchers that can be discounted, or you may manually select vouchers that can be paid.

The program prints vendor data, transaction and aging reports, and mailing labels. It will handle from 10 to 450 vendors and from 4 to 40 transactions per vendor, depending upon the number of vendors selected (this must be selected at the beginning of the program and cannot be changed later).

The program suffers from virtually the same limitations as *VersaPayables*, but is much faster. Vendor data can be entered in *VersaPayables* much more rapidly than customer data in *VersaReceivables*. Care should be used, when selecting this program, to insure that it can handle your company's demands.

Documentation and other ratings are on a parity with *VersaReceivables*. The error handling rating was lowered as a result of the program's inability to detect a user error when I attempted to manually print a voucher transaction report. This resulted in one entry being duplicated three times.

Both *VersaPayables* and *VersaReceivables* suffer from being written in Applesoft. As a result, data processing is slow.

VERSA PAYROLL

H & E Computronics
$99.95
48K; II/II+/IIe

Overall Rating	C-	C	*Reliability*
Ease of Use	D	C-	*Error Handling*
Documentation	C-	C-	*Value for Money*

Versa Payroll is a group of interactive programs on one disk that will compute and maintain payroll records for up to 500 employees. The system will allow you to print employee listings, employee year-to-date totals, and required government quarterly reports. You will also have the option of printing all paychecks, paychecks for selected employees, or manually writing the checks using system generated figures. You may also override deductions, if required, for overtime hours, commissions, etc.

Versa Payroll can be used in conjunction with the program *Versa Ledger II*. *Versa Payroll*'s manual is written for the TRS-80 computer and includes a four page Apple II addendum. The program disk is not protected.

Program operations are performed from Main Menu and Sub-Menu selections. While the program basically performs well, I feel that the Apple II version lacks the error handling and screen prompting routines that are now considered essential. A basic example of this occurs when you are requested to enter the date. You are shown a flashing cursor on the screen, but no format to enter the date. If you enter 01/01/83 you have no problem. However, if you enter Jan. 1, 1983 all you see on your reports or printed checks is Jan. 1. The reason for this is *Versa Payroll* will not allow you to enter a comma, and anything you enter after a comma will be ignored.

One nice feature of the program is that you may enter the current tax tables without sending to the publisher for an update; however, I found that certain state and local tax tables cannot be entered in the format required by the program, and this means that these deductions must be manually computed and entered at the time the payroll is prepared. I would also like to point out that only one state and one local tax table can be used, so if you have employees from different states or cities that also require income taxes, you will have to maintain a separate payroll system for each state or city.

Because the programs are written in BASIC and there is a considerable amount of disk activity, the operation of the program tends to be slow. For example, when you request that all payroll checks be printed, you must confirm this answer before each check is printed, necessitating spending several hours at the keyboard for a large payroll system.

While *Versa Payroll* will perform most of its intended operations, I would suggest that you get a demonstration from your software dealer to insure your complete satisfaction.

VERSARECEIVABLES

H & E Computronics, Inc.
$99.95
48K; II/II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	C+	C+	*Value for Money*

VersaReceivables is part of an integrated accounting package consisting of *VersaReceivables, VersaPayables, VersaPayroll, VersaInventory and VersaLedger II*. (All of the other modules interface with *VersaLedger II* according to the manufacturer). *VersaReceivables* is an accounts receivable system which the publisher estimates will handle up to 600 customers and transactions a month, depending upon the customer transaction mix. The more customers, the less transactions, and vice versa. The system is designed for an inventory based business and, contrary to the publisher's claims, is not suitable for the itemized time billing required by most professionals. The program will only permit itemization of a limited number of the most recent account transactions, with the other transactions being totalled as a balance forward.

A customer has two record files called CUST/DAT and TRANS/DAT which contain, respectively, the customer's statistical information and the transaction billing data. The billing information can be entered directly into the CUST/DAT file or an invoice can be generated which will also place the information in the file. Invoices or statements, limited to twenty-five separate items, can be generated at any time, and invoices may also be automatically generated, providing a fixed monthly charge is involved. This feature would be ideal for businesses that invoice fixed monthly charges such as pool service, gardening, etc. The program will invoice customers, print customer mailing labels, generate monthly or periodic statements, credit partial or full payments to either specific invoices or to the earliest open balance, and will also print commonly used accounts receivable reports. Reconciling open accounts is slow. Although I did not load the program to its maximum capacity, the manual states that 300 customers with twenty-three transactions each would require two hours and thirty minutes for reconciliation. The program itself is also slow entering debit or credit transactions. For example, once a debit transaction is entered by you, the program can take from twenty to thirty-seven seconds in order to accept and record the data. This is obviously a disadvantage when large amounts of data must be entered. Another disadvantage of the program is that it must use NEBS 9042 invoices and NEBS 9060 statements. I have found the NEBS checks to be over priced and would assume the same to be true for other NEBS forms as well. For $25.00 the publisher will customize the program so that other forms may be used.

Documentation is less than adequate. The manual does not explain the hardware requirements since the program was originally developed for the TRS 80, and the manual supplied with the Apple version is the original TRS 80 version. Apparently, the program has been upgraded since the manual was written, hence the on-screen menus differ in some respects from the manual. A four-page loose-leaf addendum is supplied for Apple II users, and a one and a quarter page insert for the Apple appears in the back of the manual. The two conflict. The one in the back of the manual was written for an earlier version of the program. Neither addendum, however, explains this fact. Fortunately, the on-screen prompts are sufficiently easy to follow so that the deficiencies in the manual are not critical.

The first version of the program I received was totally frustrating. Among a multitude of other defects, the program would not print invoices and would bomb when I attempted this function. Telephone calls to the vendor were promptly answered by a knowledgeable and helpful programmer who gave sufficient instructions to correct the specific problem. However, after the "fix" was applied, another bug would crawl out of the woodwork, necessitating another call and repetition of the same scenario. Finally, the programmer suggested I return the disk, and when I received the updated version, the program functioned without error. Obviously, however, the program was marketed for the Apple before it was thoroughly tested (a too common occurrence in the industry).

The current version of *VersaReceivables* is fine, given the limitations discussed above. It is suited to fixed monthly charge users. It is not suitable for itemized time billing users. Depending on the type of customer transaction your business requires, this program may or may not satisfy your needs. For example, with 450 customers, it will only handle six itemized transactions per customer. However, with eighty-one customers, it will handle sixty itemized transactions per customer. Transactions exceeding the program's capacity are converted to a balance forward category.

According to the advertising, "every *VersaBusiness* module is guaranteed to out-perform all competitive systems and at a fraction of their cost. If you are not satisfied with any *VersaBusiness* module, you may return it within thirty days for a refund." This policy should offer you an opportunity to evaluate the system prior to a final purchase, an added bonus.

Inventory

INVENTORY CONTROL

BPI Systems, Inc.
$395.00
48K; Apple II/II+

Overall Rating	B-	A	*Reliability*
Ease of Use	C-	A	*Error Handling*
Documentation	B-	B	*Value for Money*

Inventory Control gives the small to medium-sized business a tool for ordering, pricing, and managing any type of inventory. It can be used by itself or will interface with BPI's *General Ledger* and *Accounts Receivable* programs. The package consists of four disks: Data Entry, Entry Posting, Maintenance, and a sample data disk.

Inventory Control requires a two disk system and can support three disk drives. The two disk system can manage up to 1,000 items in inventory while a three disk system will track 2,200 items. With either configuration, your inventory records can include up to 500 customer accounts and 200 different vendors.

The program will monitor reorder levels for all items and automatically produce purchase orders to bring the inventory up to minimum levels. In addition, the program will produce packing lists for shipments to customers and price labels for either stocking or sales operations. The system has provisions for comparing recorded inventory levels to physical inventory results—including adjustments for shrinkage and overages. *Inventory Control* will produce reports on inventories sorted by your stock number, a vendor stock number, list price, reorder quantity, and six other criteria.

When it comes to program documentation and user-friendliness, *Inventory Control* appears to be the "weak sister" in the BPI Accounting System. Although all program disks utilize common commands, the program format is not as standardized as the other programs in the BPI system. Whenever entries are required, the program gives an audible "beep." Unfortunately, this beep is the same tone used by the Apple monitor system to indicate program interruption or a system reset. This doesn't affect the operation of the program, but it is very annoying to the experienced Apple user.

The manual is similar to the others in the BPI system, but there is no problem-solving chapter and very little troubleshooting information. For example, *Inventory Control* gives you no direct way to configure the system for various printers. During my initial test of the program, all reports and labels were printed on a single line. A short telephone call to BPI fixed the problem; I had to "fool" the program into providing the linefeed signal by telling it I was using a serial printer interface—even though my printer is a parallel model. The control for this feature was buried in the Edit Accounts command.

These drawbacks do not overshadow the utility of the system—particularly if your other accounting programs run on BPI software. *Inventory Control* does interface well with other BPI programs and provides efficient inventory management. It is simply not as polished as other members of the BPI family.

THE ORDER SCHEDULER

High Technology, Inc.
$150.00
48K; II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

The Order Scheduler provides the small business with a simple but effective computerized system for handling purchase orders. It will keep track of all unfilled and partially filled purchase orders, arrange them by the date received, and print an order schedule report for the shipping department. The number of items actually shipped is then listed on the report and entered into *The Order Scheduler*, which automatically updates the purchase order file and prints an audit trail.

To begin, you create the master file by inserting an initialized disk into drive two; no user-formatting is allowed. After the master file has been created, purchase orders are easily added by entering pertinent data:

1. Account number
2. Purchase order number
3. Date ordered
4. Date desired
5. Stock number (numerals only)
6. Total quantity ordered
7. Quantity to be shipped at each shipping period
8. Balance (to be shipped)
9. Shipping date
10. Frequency with which scheduled quantity will be shipped

Three reports are available. The order schedule report lists all purchase order data and includes a blank line on which to write the number of items actually shipped. The second report, the account status report, provides the status of purchase orders for selected accounts as of the current date. The third report, the account/order list, provides a quick reference to all purchase orders by account number in order to answer customer inquiries. It lists the account number, the purchase order number, the ordered date, and the record number.

Account numbers and purchase order numbers may contain up to eight alphanumeric characters. Stock numbers may contain up to four numerals. Purchase orders, which can be easily searched and edited, may contain up to 90 items. File capacity is in inverse proportion to the number of items on each purchase order; the maximum number of purchase orders is 1,592. If the average purchase order contains about five items, capacity drops to 530; at 90 items, file capacity is only 34. However, a purchase order is automatically deleted when the complete order has been shipped, so capacity is not a problem. Since filled orders are deleted, however, *The Order Scheduler* cannot be used as an historical file of completed purchase orders.

It is important to note that *The Order Scheduler* program disk cannot be copied. One back-up copy is provided at no additional charge upon registry of the licensing agreement. Additional copies are provided at a nominal charge.

Menu-driven, easy to use, and involving no disk swapping, *The Order Scheduler* comes with a 36-page guide which has a readable text and many examples. The main weaknesses of *The Order Scheduler* are an overall simplicity, the deletion of filled purchase orders, and the lack of report flexibility. Many users will want *The Cashier*, a companion program by the same author, which is designed to improve the report capabilities. Also, there is no provision for entering the customer's name, only the account number. The user really could use a list of all the account names as well as their numbers.

SUPEREX RETAILER

Superex Business Software
$300.00
48K; II/II+; *Applesoft* required

Overall Rating	C+	C+	*Reliability*
Ease of Use	C+	C	*Error Handling*
Documentation	C-	C+	*Value for Money*

The *Superex Retailer* serves the needs of retail, wholesale, or service outlets requiring an integrated approach to handling daily paperwork chores.

A basic transaction will allow you to enter a customer's name (and recall the appropriate address) for posting to a sales receipt or invoice. After you've entered the name, you must enter the items purchased; the price can also be posted to the invoice. The total number of items sold will be deducted from your inventory records, and you will then be asked to enter any allowable discounts, as well as applicable sales tax. Your printer will print the invoice or receipt, and record the transaction for your day's end reports.

Other features of this package include preparation and printing of price quotations, packing slips, purchase orders, customer lists, supplier lists, inventory listings, mailing lists, transaction reports, and so on.

The software comes on three unprotected disks; however if you use the program with floppy drives, five disks will be required to run it. Basically, the Master Disk is used at the beginning of your business day to start the system up. One floppy is necessary to store your on-line inventory, one is needed for your on-line customer list. The other two are required at the end of the day for storing your open invoices (charged to open accounts), and storing names to your mailing list. The software is designed to keep disk swapping to a minimum.

The documentation is not one of this program's strong points. At ninety-seven pages, it's designed to be a reference/tutorial manual, though it's weak in both areas.

Superex Retailer is a menu-driven program, written in BASIC. It therefore may operate more slowly than usual, though the Menu Selection feature makes it easier to learn and operate.

Before purchasing a piece of software of this type, you must consider the system's capacities. It can handle 1,000 inventory items using two floppy drives and

10,000 with a hard disk; 200 customer names using floppy drives and 10,000 with a hard disk; 1,000 mailing list entries with two floppy drives and 10,000 with a hard disk; and 400 transactions per day using floppy drives and 2,000 with a hard disk drive. You can readily see that the floppy disk version is quite limited, but it is large enough for many small stores and businesses.

The main menu offers you the following options: Daily Transactions, Inventory Maintenance, Supplier Maintenance, Customer Maintenance, Print Reports, Special Functions, and Exit Program. You can select a report printing option from the aptly-named report printing menu, which includes: Inventory Report; Supplier Report; Customer Report; Transaction Report; On-Order Report; Price List; Below Reorder; Day, Week, Month, Year Sales; Employee Sales Report; Mailing List; Percentage Profit on Inventory; Period Sales Report; and Inventory Value.

Any of the above selections will result in a sub-menu from which you have to make a selection. If you were to select the Daily Transactions item, from the main menu for instance, the displayed sub-menu would list these choices: 1) Customer Sales, 2) Purchase Orders, 3) Inventory Updates, 4) Price Quotes, 5) Invoice Payments, 6) Age Receivables, and 7) Return to Main Menu.

Superex Retailer can handle many of the tedious, time-consuming chores that accompany the sale of any item or service, as well as the day's end reports—including the sales transactions totals for cash, credit cards, or open account sales. Obviously, you can save a good deal of precious time by allowing this program to go to work for you.

Superex Business Software provides you with a toll-free customer support number. The program worked just as the vendor claimed it would, though it's rather slow, somewhat restrictive, and comes with an unsatisfactory user's manual.

If you're thinking of purchasing this type of software, by all means get a demonstration before you make your final decision.

Stocks and Bonds

DOW JONES MARKET ANALYZER

Dow Jones Software
$349.00
48K; II/II+/IIe/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	A-	*Value for Money*

The *Dow Jones Market Analyzer* is a powerful technical analysis tool for stocks and other investments. The program is largely menu driven, with single keystrokes carrying out complex operations. For example, with only four keystrokes from the Main Menu, you can get current-day quotes for any stocks and then add those quotes to your historical file. That does not sound like much until you realize that the computer has to go through many steps to do this. It must load several different programs, connect to the phone line, dial a local Tymnet or Telenet number, log onto the Dow Jones computer, issue all of the correct commands to retrieve the needed data, log off the Dow Jones computer, and hang up the phone. Finally, it must reformat the data retrieved from the form received and stored on a temporary work disk to that required by the history disk. Once begun, the process is automatic, with provisions to note any errors and even to attempt an automatic recovery from those errors. Once data is stored on the history disk, the program has many charting capabilities for performing technical analysis on one or several stocks. Briefly, there are several varieties of moving averages, straight-line constructions (such as a least squares fit and varieties of trend-lines), price/volume indicators, and oscillators. All graphics are displayed on the Apple Hi-Res screen. You can save the screen for later printing with a routine and printer of your choice, or you can insert a screen dump routine into the program if you have one. The manual provides sub-routines for the Grappler interface card, Apple Silentype, and Trendcom 200 printers. Finally, along with the program, you receive a Dow Jones News/Retrieval membership and one hour of free, non-restricted use of the service.

First, I must comment on the use of the Apple computer for technical analysis of stocks. Most technical analysis makes extensive use of graphing techniques. On the Apple, you must perform this analysis using graphs displayed on the Hi-Res screen, which, unfortunately, is too small to do an adequate job, especially if your analysis techniques encompass several years of data and rely on long-term trend-lines to establish past performance. The *Dow Jones Market Analyzer* takes this into account and always uses the maximum horizontal screen space for the displayed graph, regardless of how many points are to be plotted. For this review, one chart was plotted using 252 data points. At this density, the individual days cannot be distinguished on the screen. The plot represents the limit that the program can handle. When plotting large data files, you have the option of only using part of the file, but you cannot specify which part. If you specify a number of points lower than maximum, only the last will be plotted. There is no way to plot just the front half of a file, for example.

Once you construct the basic plot for a stock, you have a number of options to call upon for analysis. Perhaps the most common is the moving average. Standard, weighted, and exponential moving averages may be plotted, with you specifying the number of days and weights. A simple 12-day moving average is shown in the example. Many believe that when the stock price crosses its moving average, that is a buy or sell signal. Others compare several moving averages with different time spans to assess the strength of a stock. In addition, the program allows you to construct "trading bands" around the moving average, plotting the average as some specified point above or below its actual location.

Another common, simple analysis technique involves the construction of support/resistance, or trend-lines. The program will allow you to draw either, using stock high, low, or closing prices as the basis for the lines. When drawing these lines, you indicate endpoints with a graphics cursor that moves from left to right across the graph. The arrow keys control this movement. The date; high, low, close prices; and volume for the entry

at the cursor and entries on either side of it are shown at the bottom of the screen. Pressing H, L, or C indicates to the program that you want high, low, or close price for the point in question. This is an elegant solution to the problem of designating plot points, but on a large data file, it takes much time to move from one side of the screen to the other (a couple of minutes when using 252 data points). The program could be greatly enhanced by putting in commands to allow speedier movement through the data.

In addition to trend-lines through data points, the program allows you to specify 1/3 and 2/3 speed resistance lines. These lines are drawn above or below existing trend-lines and at a steeper or shallower angle, depending upon whether the trend-line is moving up or down. The analysts say that the lines indicate areas of support or resistance for a stock once it crosses its trend-line.

One problem with the program is that you cannot save your work. Once you have taken the time and trouble to draw all of the various trend-lines, moving averages, etc., the commands that produced those indicators are not saved. Thus, the next time you want to look at that stock, you must reconstruct your previous work. The only provision for saving work is to create a binary file of the Hi-Res picture.

Not all analysis is performed using stock prices. Trading volume is often considered essential for recognizing accumulation or distribution. If a stock breaks through its trend-line on the upward side without significant activity, some would consider the upward move to be weak. Thus, trading based on the breakout might be questionable. The normal program display shows individual-day volume performance below the price graph. The volumes are normalized to the lowest value in the period being graphed (one day will always show zero volume), and the average trading volume is shown by a broken line. The value of this average is displayed on the bottom of the screen.

Other available volume indicators are the negative and positive volume (NVI, PVI), cumulative volume (CVI), price-volume trends (PVT), and daily volume (DVI). The NVI and PVI relate drops or rises in volume to changes in closing price. The CVI maintains a running total of excess up-volume over down-volume over time (using standard techniques, since actual volumes associated with up and down moves are not known). The PVT is an offshoot of this, using percentages of the price move to determine how much volume to add or subtract to the cumulative total. Finally, the DVI indicates volume moves based on whether a stock closes above or below the mid-point of its daily high/low range. The program computes all of these indicators based on standard formulas, all listed in the manual. Their use is optional, and their value is largely subjective. Most technical analysts use only a few indicators, and they develop a feel for how those indicators act over time for particular stocks.

The *Dow Jones Market Analyzer* also produces oscillator charts, which show trends that may not be obvious from simple graphs. One example is a "momentum" curve: classically, the moving average of a moving average. The oscillator is created in the form X(I) = A(I) -Z(I), where each of A and Z are different indicators. The creation and use of these oscillators are limited only by your imagination. I cannot comment on their validity.

The last analysis technique allowed by the program is comparison charting. Using this, you can compare how a $100 investment in a stock or market index performed in relation to another stock or market index. Five different stocks or indices may be displayed simultaneously. They are shown in different colors, so if you have a monochrome monitor, you may have trouble picking an individual line out of the chart when they all run together. The same problem occurs when attempting to print comparison charts.

The program is well constructed and works very well in all commands. The manual is good, but a bit sparse. It seems that the program has been updated recently, but the manual has not. For example, recently the Dow Jones computer service added the capability to retrieve up to a year's historical prices, instead of 24 days as in the past. The program allows you to access the full year's prices, but the manual only indicates the capability to retrieve 24 days. The manual addresses the problem that someone with an old Apple II with a RAM card faces when loading Applesoft and then running the program (simply booting the disk won't work). The instructions call for booting the Apple master disk first to load Applesoft, then booting the program disk. This does not work. Instead, first boot the Apple master and then issue the command Run Menu to start the program. The program disk is copy protected, with the caution that a copy attempt will destroy the disk. I didn't try it. Provided with the program package are two system disks (one a back-up) and two blank data disks (one for historical records, the other for temporary data).

The *Dow Jones Market Analyzer* is a significant tool for technical analysis of stocks and similar investments. If technical analysis is your forte, and you can live with the constraints of the Apple Hi-Res screen, then this program may be of considerable help to you. Note that a Hayes Micromodem or acoustic coupler, a second disk, and a printer are highly recommended. Also, a color monitor helps when comparing stocks.

DOW JONES MARKET MANAGER

Dow Jones Software
$249.00
48K; Apple II/II+/IIe/IIc/III in emulation mode; Hayes Micromodem

Overall Rating	C	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	C+	*Value for Money*

Dow Jones Market Manager claims to be a portfolio management tool for the private or professional investor who requires an accounting and control system for maintaining multiple portfolios. The program is part of a series marketed by Dow Jones. It performs as advertised. However, it is limited in that transaction costs, stock dividends, dividend date, and option termination dates are not recorded, making it impossible to obtain a yield analysis, monthly income forecasts, a price/earning analysis, or a summary of transaction costs. While these are not *necessary* for portfolio control, the actual yield being obtained (as opposed to the dollars) is necessary to determine if your investment strategy is working.

The program is copy-protected and the manual states that "copying will make your program disks unusable." Two program disks come with the package. Further back-up disks are available for $30. If you don't have all of the hardware listed, the program will let you operate without a particular item. All are recommended, however, for efficient operation.

The program will control up to 26 different portfolios with a maximum of 150 "tax lots" or positions. You may access the Dow Jones computer for each stock in your database (up to 150). In addition, you have the option of retrieving and storing a total of five news stories concerning your stocks on the data disk. This program, like the others in the series, cannot transfer data to other Dow Jones programs, nor can it retrieve data obtained by the other programs. This effectively doubles or triples your data retrieval costs if you use all three Dow Jones programs on the same stocks (the *Manager* and the *Analyzer* are the two you would most likely use together).

The *Manager* is menu-driven and easy to operate. Follow the instructions to communicate with Dow Jones, maintain a portfolio, generate reports, price securities, set up your system, and perform a number of maintenance utilities. When you communicate with the Dow Jones computer, you have the option of gathering news, current quotes, looking at stored news, or going into a terminal mode where any of the other Dow Jones databases can be accessed. In the portfolio maintenance mode you may add, change, or delete transactions, enter cash transactions, and delete gain/loss entries. Entry of cash can help keep track of transaction costs and dividends, but will not give you accurate yield analysis. Four reports are available: holdings by portfolio; holdings by symbol; realized gains/losses; and an audit trail of year-to-date transactions. When in the pricing securities mode, you have the option of auto or manual pricing. Using the auto pricing option the computer will do all necessary data retrieval, display and storage. In the manual mode, obviously, you enter the data yourself. The last recorded entry is shown as a default. Finally, utilities are provided to create a new data disk, erase a gain/loss file, erase a year-to-date file, back-up a data disk, and condense an open position file (necessary when your transactions approach the 150 limit).

The *Dow Jones Market Manager* is an adequate portfolio management program that complements the others in the Dow Jones series. It can serve the needs of many, but is deficient in a few key areas.

DOW JONES MICROSCOPE

Dow Jones Software
$349.00
48K; II/II+/IIe/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A	*Value for Money*

The *Dow Jones Market Microscope* is designed to assist the investor who makes decisions based on fundamental market information, versus technical analysis like that performed by the Dow Jones program, the *Market Analyzer*. The fundamental indicators used by the program are those on file in the Dow Jones computer timesharing database. A total of 68 indicators are recognized. From those 68, you may select up to 20 and pull them from the Dow Jones database for storage on the program's data disk. The data disk will hold up to 20 lists of stocks with up to 50 stocks in each list. That gives you a total of 1,000 stocks and 20 indicators per stock on a single data disk. One drawback is that the same 20 indicators must be used for all stocks on the same data disk. The solution to this is to use multiple data disks for storing data—one disk for every different set of indicators (assuming that you need more than 20).

To start the program you must have Applesoft loaded into your computer. The manual makes no provision for older Apples with a 16K card and Integer BASIC on the motherboard. The correct sequence

requires you to first boot the DOS Master disk to load the 16K card, and then issue the command Run Mod with the *Market Microscope* disk in place. From that point on, the program is menu driven and, with a quick test using the sample session, easy to use. Note that the *Dow Jones Microscope* is compatible with the IIe.

I ran the program to its limits. I selected fifty stocks (half on the New York and half on the American exchange) and automatically retrieved 20 indicators for each stock. The indicators were selected such that both the Dow Jones Media General and Corporate Earnings Estimator databases would have to be accessed. All information was accurately obtained and stored on disk. At 300 baud, from logging onto the Dow Jones computer to hanging up the phone took 80½ minutes. Current rates for the two databases used (assuming the Blue Chip membership discount and non-prime time) is 60 cents per minute. The basic data, therefore, cost $48.30. You will probably incur lower costs because you will rarely need to screen 50 stocks, but be advised that this screening is expensive. You will have to decide just how much you are willing to pay for the data. The program has no provision for entering the data manually, so you are locked into using the Dow Jones computer service.

Now that you have collected the data, the program gives you several analysis options. The first that you will probably want to use is the option to screen your stock choices for possible purchase. You may specify up to 16 of the 20 indicators on which you collected information and create a "buy screen." For each of the indicators on your screen, you will be asked to specify if you want the stocks ranked from low value to high, or high to low value, and the critical value above or below which you consider the stock a poor buy. Once the complete screen is specified, the program will search the data for each stock and rank them for each indicator. The symbol "*" is used to indicate where the critical value that you specified is for each indicator and ranking. All of this information can be printed for your inspection. In addition, a matrix shows stocks versus indicators. From this matrix, you can readily see which stocks fall within all or the majority of your indicators. This part of the program works well. When you have a portfolio and want to screen for those stocks that you might wish to sell, the program sets up "sell screens" as well. Before entering buy or sell screens, do a bit of research and make certain that you have the information required on hand before starting. To avoid inaccurate results, examine the raw data collected from Dow Jones for its format and make certain that you use the same.

A second analysis option is the production of "price alerts." Instead of gathering data on all indicators, the program will access Dow Jones for the current price and volume only. Using screens you establish with up to 12 criteria, price alerts may be issued when the criteria are met. In addition to the preceding features, the *Market Microscope* also has the E-Z Terminal features of all Dow Jones software, allowing you to access the portions of the Dow Jones database not automatically accessed by the program. The program has no provisions for using collected data, but this option does allow you to obtain news stories from the *Wall Street Journal.* Finally, the terminal program is not particularly sophisticated, but serves the purpose of logging you on and accessing data.

If fundamental analysis is of interest to you and you need a program to collect basic information, and then screen that information in various ways, the *Dow Jones Market Microscope* should be high on your list of programs. On the other hand, if you are a casual investor who buys one stock a year, the expense of the program and data collection may not pay.

MASTER BRAIN BOND CALCULATOR

Decision Programming Corporation
$375.00
48K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	B-	B	*Value for Money*

Master Brain Bond Calculator performs bond and other fixed-income securities calculations, allowing you to evaluate them according to price to yield, current yield, yield to price, accrued interest, after-tax yield, and other more arcane functions such as odd first coupons and concessions. That's all it does, but it does it very well. It also has a math mode for mathematical calculations and computes useful figures such as exact days between dates and future value of a present sum.

The package includes a single copyable disk and documentation in a binder. The documentation is adequate. It has a glossary of terms used in the bond market, plus a table of contents, an index, and an appendix. Unfortunately, the instructions didn't match the disk exactly, as if the disk represented a slightly later version. I also found other small errors, such as transposition of price/yield and yield/price. However, a little thought and some experimentation resolved the mystery. Whoever drafted this intelligently written manual clearly knows bonds and mathematics well.

I found the program easy to master, particularly after following the manual's tutorial style through the

functions. It took me only fifteen minutes or so to master the mechanics and begin entering data comfortably. After a while, it actually seemed fun. The ease of use encourages experimentation and "what-if" projections. You can crash the program if you insist on entering incorrect data, which meant that at one point I had to start over (cold boot) to recover the program. This caused me to lose my data, but hardly constitutes a tragic flaw since you only enter a few items anyway.

All functions including printing (with a Mannesmann Tally Spirit) worked perfectly.

This highly specialized program will appeal to brokers, investment counselors, and serious (or well-heeled and lighthearted) investors. It's not cheap, but it does what it claims to do quite well and easily. (The company also produces the same program to run on a portable calculator.)

MICRO PMS

The Boston Company
$490.00
64K; Apple II+/IIe/III in emulation mode

Overall Rating	B-	B	*Reliability*
Ease of Use	C-	D	*Error Handling*
Documentation	C-	B-	*Value for Money*

A respected stock brokerage firm owned by American Express published this ambitious program, which promises to handle portfolio accounting (recording sales and purchases, evaluation based on the day's closing prices, etc); investment analysis and advice on what to buy or sell to accomplish your designated investment objective; and performance appraisal over time. You will need an abundance of time and patience to make full use of the program's power.

You actually get a subscription when you buy *Micro PMS*. The package contains 110 pages of documentation with sample charts and screens in an assortment of type styles (no chapter tabs, illustrations, color, or index), three program disks, a blank Portfolio disk, and the first of twelve monthly Master Stock Data disks. The next eleven arrive by mail. Additional annual subscriptions cost $295. The Master Stock Data disk contains one year's price history plus monthly updated fundamentals on 1,500 of the most widely held stocks, including earnings, dividends, P/E, yield, and total capitalization, plus The Boston Company's ratings for safety, risk to market (beta), and quality. You can update any data manually or update the current price through the Dow Jones quotes service (by telephone modem).

Many less expensive and more easily used programs perform portfolio accounting and analysis. *Micro PMS* possesses the special power of screening the fifty fundamentals provided for each of the 1,500 stocks monthly according to your criteria. For example, you might want to see what stocks you could purchase with P/E less than ten, a price less than $20, and return on equity greater than 30%. You can enter up to ten criteria for each screen. If more than fifty stocks meet the criteria, the program prompts you to define further criteria.

Performance Analysis treats your starting portfolio like a mutual fund bought for $100. Over a period of months the program indexes your portfolio and compares it to index values for the Dow or S&P 500 (supplied each month on the Master Data disk). You can rank your holdings based on the screening criteria (for example, in order of yield, or price-to-book ratio) and create bar charts or X-Y plotted graphs.

Finally, you can choose a portfolio objective, whether income, growth, or aggressiveness. The program then rates and weights each stock in your portfolio and identifies buy and sell candidates to help you come closer to your objective. You can play "what if" buy and sell scenarios and compare the results to your target. You can print all results with multiple formats or save them as DIF files to use with *VisiCalc*.

The absence of good documentation makes this complicated program difficult. More examples of applications would help all but the full-time professional investor. An index should be the first priority. To my confusion, many of the screens shown or described in the manual differed from those in the program. Moreover, error catching is nearly nonexistent. For example, choosing out-of-range parameters for charts or screens drops you out of the program. The return route is tedious and time consuming. On the plus side, the publisher won't go out of business tomorrow, and you can call a toll-free phone number for assistance. In theory, the program has a substantial advantage over its competitors in that it limits you to the 1,500 stocks on the monthly disk while the others limit you to the stocks you have selected in your initial screening. The latter method not only usually costs more, but requires you to perform the first screening.

The part-time investor will find this a very valuable tool, particularly if the company corrects the problems (they give no update policy at present). If you get it now, however, expect to invest a substantial amount of time and effort.

OPTIONX

Crawford Data Systems
$145.00
48K; II/II+/IIe/IIc/III in emulation mode)

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	A	A	*Value for Money*

This straightforward and powerful program for the Apple II+ or IIe computer evaluates Put and Call stock options. It does not attempt to evaluate spreads, straddles, or other combinations. Instead, it provides in-depth mathematical calculations and statistical probabilities for Puts and Calls on selected stocks, with the objective of locating under- or overpriced options. You begin by configuring the program, first for your hardware, then for your specific circumstances in the market (your broker's commission schedule, the cost of money to you, whether you own the stock evaluated on the sale of a call, and so on). Each time you run the program, you enter the date, choose "Put" or "Call," and enter the stock symbol. Then you enter the strike price and date for each option. The computer performs all the calculations necessary for comparison in nearly thirty categories for each option on the same stock.

OptionX first calculates the theoretical value for the option, days to expiration, hedge ratio (effect of stock advance or decline on option price), and leverage (ratio of 1% move in stock price to 1% move in option price). The theoretical price is determined using your choice of two mathematical models, Black-Scholes or Cleeton. (The excellent eighty-eight page manual explains and compares both models.) After you enter the actual prices for up to nine options on the same stock, the computer calculates the difference between the actual and theoretical prices, then the required movement of the stock (in dollars and percent) to make the option worth exercising, the dividends paid to expiration, commission to purchase, holding period to expiration, margin cost, and the maximum, minimum, and expected return on an investment, assuming the underlying stock price does not change, increase or decrease by one standard deviation based upon its volatility. A risk/reward ratio concludes the option purchase evaluation.

The above computations require the dividend amount, date of the last dividend payment (to calculate quarterly payment dates in the future), and the volatility of the underlying stock. *Barron's*, or other financial publications, can provide this information. On the other hand, if you use *Dow Jones Market Analyzer*, the program uses your stored stock price histories to calculate the stock's volatility. You can then store volatility and dividend information on disk for each stock you wish to evaluate regularly.

The covered writer of Calls or Puts can specify additional calculations: holding period (number of days you designate or compute to expiration date), margin cost (of owning the stock at its net cost), immediate return on investment from the sale of the option, and annualized return on the covered position if the stock price remains the same. Assuming you exercise the option, the program computes the maximum return for the holding period annually. Dividends and the cost of money are included in all of these calculations. Finally, the program calculates the expected profit based on the assumption that the stock will behave with the same volatility as in the past, but will be likely to move up or down one standard deviation. Expected profit equals the probable average result of selling the same option many times, assuming the likelihood of both up and down markets. All calculations consider commissions, with a provision for zero commission on the stock purchase if you already own the underlying stock in a covered write position.

I found *OptionX* a delight to learn and use. The professional documentation presents and explains all mathematical equations. You can enter option prices using either fractions or decimals. Once you have entered the stock symbol, the program defaults to it for additional entries and the expiration month. A single command from the keyboard prints any of the 40-column screens. One improvement I would like to see is automated data entry, perhaps using an auto-dial/log-on routine for *Dow Jones News/Retrieval*. You could set up your own macro of stock symbols for automatic retrieval and direct insertion into the *OptionX* analysis.

OPTIONCALC

Savant Software, Inc.
$89.00
48K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

OptionCalc uses Black-Scholes' theory to calculate the theoretical Put and Call option values for a given stock. You input the current date; stock symbol, price, and volatility; T-bill rate; quarterly dividend per share; next ex-dividend date; exercise price; and expiration month. Given this information, the program calculates the Put and Call option values, the exact expiration date, the delta or hedge ratio, and the Put and Call symbols. All data appears on the screen in an easy-to-read format. You may change individual items in order

to make "what if" exercises easy. (The Black-Scholes model is well known to option players. This review makes no attempt to validate that model.)

OptionCalc's screen display is good. Each item to be entered appears on its own line. Cursor control allows you to move to any entry at will. Date entry is particularly interesting. The program recognizes virtually any form of the date that you might want to use. The month may come first or second, be spelled out or abbreviated, be a number, etc. Any date between 1980 and 2079 will be accepted. If you are still using the program in 2079, I suspect that you may be able to talk Savant Software into updating it. Numbers are equally easy to enter, and are recognized in many forms. For example, 9.25 and 9 ¼ are both recognized as the same number. The program handles calculations to six significant digits.

The basic use of the program is to see if Put and Call options are over- or under-priced in today's market. The manual outlines various methods of doing this, although some specific examples would be helpful. The program provides excellent visual display of both the input and ouput data. The only problem with this program is that you have to pay for it. The Black-Scholes model, which forms *OptionCalc's* useful core, is available in several forms through your local computer club as public-domain software.

OPTIONS-80

Options-80
$125.00
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B+	*Value for Money*

Options-80 is a helpful package used for analyzing investment opportunities in stock options. The program compares the potential gains or losses from the sale or purchase of puts, calls, and spreads. Although stock options are widely traded—often the number of options traded exceeds the daily volume of trades in the stock itself—these legitimate investments are viewed by the uninitiated as the "lottery tickets" of the Exchanges. *Options-80* does not reduce the risk in trading options; it merely calculates that risk in terms of an annualized return (or loss) on money invested in the option position, a helpful tool in weighing the options available.

The single most disappointing feature of this program is that it requires manually inputting the current prices for the options to be compared. The Dow Jones News Service, through modem connection to a local telephone number, provides current quotes for listed options at a cost of ten to fifteen cents a minute. Yet this program requires you to input current prices from the *Wall Street Journal* or some other source. This is inconvenient—large paper, small print, and you must convert fractions to decimals. But, more important, it often makes data unavailable in time to construct models for decision making. If the morning paper arrives as the market opens, the option prices, in most cases, will have changed by the time the decision-making models can be constructed. I would gladly have paid twice the price for this program with the auto-dial and log-on feature found in the better stock market software.

With that criticism aside, the program does well what it promises to do. The documentation is well done and even entertaining. It has an index, but should have an appendix of defined variables. One graph can be used to compare one, two, or three options on the same stock—three calls, three puts, three options, etc.—each with striking price and/or expiration dates. And there is more. The program also compares different spreads, decisions of whether to buy back an option previously sold, and writing covered calls. For all of these, the graphs show the annualized return on the option positions relative to the up or down movement of the underlying stock. Graphs can be printed immediately (provided you have written a screen dump program, which can be easily inserted to this software) or saved to disk (but a second drive is not supported).

The program allows you to configure several other components to the investment return analysis which are often ignored: commission cost, dividends on the underlying stock (if owning the stock is part of the transaction), the cost of money, and the difference between buy and sell prices. The program also computes in dollars for any option transaction contemplated, the immediate cash received or cash required and the maximum risk of any deal. Understandably, it does not quantify risk, nor does it attempt to compare such open-ended positions as the "naked" call write.

Options-80 does all the arithmetic for analyzing your option alternatives, according to your cost of money and commissions circumstances, in terms of annualized yield potential. If there is a revision with auto-access of current quotes, my rating would go up.

OPVAL

CalcShop
$175.00
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A	A	*Value for Money*

OPVAL assists investors in evaluating stock options strategy. It uses a dividend-adjusted Black-Scholes valuation model for computing theoretical prices and hedge ratios (deltas). Strategies include covered and uncovered writing; bull and bear spreads; vertical, horizontal, and combination spreads; straddles; spraddles; straps; strips; option hedges; reverse option hedges; and diagonal, box, and butterfly spreads. Simple graphs, which do not require a graphics interface card, display the effects that stock price movement and/or the passage of time have on any complicated or simple position in a stock and its options. In addition, when you enter the stock price, running the model backwards estimates the future volatility of the stock. *OPVAL* automatically retrieves current stock and option prices from the Dow Jones News/Retrieval Service for up to eighty stocks. This includes automatic log-on, data retrieval and writing to disk, and automatic log-off and hang-up. A D.C. Hayes Micromodem II is required for automatic retrieval of option data, and a printer is highly recommended.

Actual program operation is very simple. To calculate the theoretical prices and deltas for Puts and Calls, enter the day's date and the annual interest rate on short-term Treasury bills. Next, load from disk or from the keyboard the current price and annual dividend of the stock, its volatility, the options cycle, and the strike price of the option. The program provides a table of volatilities, although this information requires verification and updating. Divided into categories, program information displays on the monitor like the pages of a book. You can easily move from one page to another, and any page prints out with one keystroke.

The manual, eighty pages in length including appendices, is one of the best written I have read. Conversational in style, it thoroughly discusses program operation and options in general. The appendices give an example of each page and a detailed description of each operating command. Vendor support, equally good, features a twenty-four hour hotline to answer any questions.

Only recently has the intelligent investor come to realize that options are not instruments of speculation, but a means of achieving a superior return with a simultaneous adjustment of market risk exposure. *OPVAL* provides all of the necessary tools to achieve that goal.

PORTFOLIO MASTER 4.1

Investors Software
$195.00
64K; II+/IIe;

Overall Rating	B-	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B-	B-	*Value for Money*

Portfolio Master 4.1 helps to manage a securities portfolio: it records purchases and sales, computes gains and losses, keeps track of option expiration dates, and evaluates current holdings. For the latter purpose, the program can access the Dow Jones News/Retrieval Service to obtain current prices for securities in the portfolio, or they can easily be entered manually from other sources. No historical price information is recorded, nor is any charting capability included.

A single data disk can store many named securities' portfolios (just how many is not specified), each one consisting of purchase and sale information for up to 100 different securities. The program is designed to accept transactions involving any of a wide range of security types, including stocks (long and short positions), options, bonds, and even rights and warrants.

The program automatically maintains a Cash entry, and partially keeps track of changes in Cash due to purchases and sales. However, there is no direct provision for a margin account. Both stock splits and stock dividends can be recorded, but you cannot record covered options on your own stock.

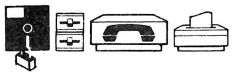
The program allows you to print onscreen, or with the printer, several different 40-column reports showing gains and losses (both long and short term), specific purchase and sales information, and expiration and/or maturity dates for options, bonds, T-bills, etc. Some good features include summarizing securities by category, sorting by name within category, and showing, for each security or category, the percentage its value bears to the entire portfolio. In addition, there are two 80-column reports summarizing all the above information as either unrealized or realized gains and losses. Unfortunately, by including all types of securities in the same format (essentially a stock format), these reports afford only sketchy treatment of certain other types of securities. For example, they do not include option strike prices or dividend and bond yields.

This program has a competent user interface. Menus are organized well enough, and data entry and correction are easy (however, prices can be entered only as decimals). It contains provisions for a variable printer and modem slots, as well as printer control functions and line feed control. A password and two different phone numbers can be stored for Dow Jones access.

This latest version is written on ProDOS, making it faster than prior versions. Also, it has been revised for the new capital gains tax rules.

The documentation consists of a small, seventy page manual which is quite readable as far as it goes, although it needs amplification (to include all menus and to discuss all input options). No sample reports are included: a serious omission. But a sample portfolio is provided with the program for experimentation. The program disk is protected from copying by ordinary means, but a free backup disk is promised upon return of a completed registration card.

This is a useful program, easy to use, and is general enough for the average investor. On the other hand, it falls a little short of the needs of a professional securities analyst.



STANDARD AND POOR'S STOCKPAK II

CBS Software
$150.00
48K; Apple II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A-	*Value for Money*

For anyone at all serious about turning his or her personal computer into a financial tool, there are a number of financial information services or databases currently on the market. These services typically fall into two types, namely, the on-line systems that offer the opportunity of downloading over the telephone line large quantities of information from a giant centralized computer, and those that provide you with your own database (obviously on a smaller scale). In the latter category, *Stockpak II* is a fundamental (as opposed to technical) analysis software system that helps you find and interpret important financial facts about stocks of interest. The system consists of a program disk that provides the various options for extracting, manipulating, and displaying the more than one hundred S & P Stock Guide information items on as many as 2,300 companies (stored on a database disk). You can also create and store an additional twenty-five such items of your choice. After a $30 startup fee that also purchases a copy of the S & P Stock Guide, you have your choice of four different database disks: $245 for 1,500 NYSE stocks, $245 for 800 AMEX stocks, $490 for 2,300 OTC and regional stocks, and $245 for the most popular one, a sampling of over 1,500 NYSE, AMEX, and OTC issues. Each database is updated monthly and mailed to subscribers of the *Stockpak II* system.

The entire program is menu-driven, making it easy to use and self-explanatory. Nevertheless, it comes with well written, graphically illustrated, and professional looking documentation that carries you step-by-step through each of the five options offered on the Main Menu.

The first option, a Look Up mode, displays in either tabular or bar chart form all the information about one stock. Specifically, when you enter the corresponding ticker symbol, a Look Up data page displays such information about the stock as its estimated earnings per share for the current year, dividend, recent price, beta, etc. Next, a Look Up Ratio page displays a variety of performance measures such as price to earnings ratio, debt to book value percentage, yield, etc. Finally, the third Look Up page displays a bar chart graph of the earnings and sales data. You can view any of the above pages onscreen or print it out (the program supports a variety of popular printers and interface cards).

The second option allows you to compare the performance of several companies. Their behavior, according to one or more information items (supplied or created) stored in the database, is displayed on a bar chart. You can enter as many as fifty ticker symbols and twelve different information items for comparison, and select between a single or multiple graph presentation. You can enter the ticker symbols either from the entire database disk, or from a spinoff file disk you have created as a customized subset of the database which satisfies certain criteria (such as in the next option).

The third option screens the database for any and all companies that satisfy a specific criterion, such as a yield greater than twelve percent, or a set of criteria of your choosing. Here again, you can either use any of the ten canned criteria sets supplied, or create your own.

The fourth option permits you to prepare printed reports of the information available on companies in the database. You may either use one of the readymade formats or create and edit your own.

Finally, the fifth option allows you to select a set of access support functions, such as creating new information items, new criteria sets, or report formats, or formatting a spinoff file disk.

While I found the entire program well thought out and hard to fault, a few features did disturb me (I hope future versions will correct them). To begin, many of the information items contained in the data library do not lend themselves to graphic display, such as those with a yes or no answer (for example, "Does the stock trade options?"). Thus, if you erroneously choose one of these items for performance comparison of several

stocks (the second option), the program does not default but rather displays a meaningless bar chart corresponding to this choice. Why not have the program ask you to make another choice when you err in this way?

Another problem occurs when you perform multiple screenings of the database. After each screening with a given criteria set, you can, if you wish, modify the parameters before the next screening with the same set. Unfortunately, if you chose too stringent parameters for the most recent criterion so that the scan of the database turns up the null set (no stocks satisfying this and all previously chosen criteria sets), then you cannot relax the conditions; instead you must start the screening process over from the beginning. I judge this an inconvenience because you cannot tell in advance when the final screening will come up with zero stocks to satisfy the conditions. Even when the sequence of screenings produces a result other than zero stocks, the printout of the corresponding ticker symbols shows only the last criteria set that they satisfy, rather than all the sets in the sequence. Consequently, this printout looks exactly the same as the one where you used only the single set (with different results, of course).

Another negative feature concerns deletion of a ratio that you've created. If you want to delete a ratio other than the last one you created, you must delete all subsequent ratios and then recreate those you want to keep. For a large number of created ratios, this can be a major inconvenience.

In conclusion, be forewarned that, regardless of the quality, programs of this type won't necessarily improve your investment results. Such electronic number crunchers can't replace human judgment when it comes to analyzing the quality of the figures or predicting the future course of a company's earnings. Nevertheless, fundamental analysis is a step in the right direction. With this in mind, *Stockpak II* is well worth the investment.

STOCK MARKET ADVANCE/DECLINE TIMING PROGRAM

Dr. Roger Altman
$149.00
48K; II/II+/IIe/IIc

Overall Rating	C-	B	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	D+	C-	*Value for Money*

The *Stock Market Advance/Decline Timing Program* is designed to give guidance on overall market movement, not on individual stocks and options. It uses daily and/or weekly data of New York Stock Exchange (NYSE) Advancing and Declining Issues, which are entered into the program from the keyboard. The program then calculates the Advance/Decline Line (ADL) and makes "predictions" on the performance of the market, including recommendations on the trading action to be taken. These predictions and trading actions are presented for upmarket (bullish) predictions and downmarket (bearish) predictions, with the predictions based on market expectations for the next 5-25 days using daily data, and 3-13 weeks using weekly data. Advance/decline points (a measure of performance calculated by the computer) are indicated for the bullish and bearish predictions, with the expectation that the investor will take the action that will yield the largest amount of positive Advance/Decline points.

The timing system used in the program is based on the penetration of one exponential moving average through another. The author claims that the degree of penetration as well as the time period used for both exponential moving averages were derived from computer analyses of a database consisting of thousands of prefiltered input values.

Program usage is straightforward. Upon booting the disk, you will be asked if you wish to use a Silentype printer to record results. The program will apparently work only with a Silentype printer, as I could not get proper operation with my Epson MX-100 (with Graftrax) and a Grappler+ interface card. Next, you will be asked to select either the daily or weekly option, and then you will be given the opportunity to manage the existing database or enter new data into the database. Following completion of data entry, the program will make its predictions. You may view either all of the predictions to date, or only the most recent predictions. After viewing the tabular output, you will be given the opportunity to see a graph of the ADL as well as a plot of the points gained in both rising and falling markets. This graph is very difficult to read, as there are no labels or values presented for either the horizontal or vertical axes. Following presentation of the graph, the program is terminated.

The problem with this "one pass through" system is that you must reboot and go through each step every time you want a different option, such as looking at all of the predictions instead of just the most recent ones. Also, if you change your mind after making a selection, you cannot escape except by pressing Reset and rebooting.

The program is copy-protected, and a back-up disk is provided. Vendor assistance is very difficult to obtain, as the author is an independent publisher with just a post office box for an address and no telephone number shown.

The "manual" consists of 15 loosely bound, single-sided sheets, more in the style of a technical paper than a manual. The write-up could have been clearer on how to interpret the predictions.

The bottom line with any system is how well it performs its intended job. In my opinion, *Stock Market* does not perform well. Looking at the 1983 predictions at the time this review was written, we have the following:

A/D Points	Bullish	Date	Bearish	A/D Points
	Buy	12/23/82	Cover	
+2	Sell	01/03/83	Short	
	Buy	01/04/83	Cover	-596
+2090	Sell	01/21/83	Short	
	Buy	01/27/83	Cover	-16
+4519	Sell	03/14/83	Short	
	Buy	04/11/83	Cover	781
+2911	Sell	05/02/83	Short	
	Buy	05/05/83	Cover	-1184
+135	Sell	05/17/83	Short	

In just 5 months, the program made 5 Buy/Sell recommendations, with 3 of the 5 involving buying and selling within a one-week period. The only ones guaranteed to make money with this approach are your stockbroker and the IRS.

While the ADL is one of the most important indicators of overall market performance, it should be used in conjunction with other indicators to get the most accurate picture of the market. Furthermore, no purely mechanical system will ever replace logical analysis and rational judgment by the human investor.

THE WALL STREET PLOTTER

Dickens Data Systems, Inc.
$125.00
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	B+	*Value for Money*

The Wall Street Plotter accepts data input from the keyboard or a file created by a "data capture" program, graphs that data for any defined 84-day period, and creates an optional four-day moving average for the data. If you wish, the program will also perform a trading cycle trend analysis: a form of momentum analysis which issues buy and sell signals in the form of graph threshold crossings. You set the thresholds using a measure of stock volatility. This program, however, only performs technical analysis, and you are advised that the program may issue several buy signals or sell signals in a row with the possibility that a sell signal will be at a lower price than a preceding buy signal. This points out a truth about stock market analysis programs: never trade on the basis of a single technical indicator. Indicators are guides, not infallible trading signals.

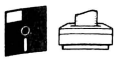
The Wall Street Plotter has several sub-programs, including a data file editor, a plot generator for the high-low-close plots, the trading cycle trend analysis program, and several system utilities. The editor allows you to create a new data file, save data to disk, list files to the screen or printer, or modify data files. The standard graph is a daily plot of high-low-close prices along with volume. To this you may add a four-day moving average. Generally, the program will select the vertical axis divisions. You may, however, set them yourself in order to correlate other charts from the same stock over different time periods.

The trading cycle trend analysis program analyzes the data file, then produces a double graph showing stock prices on the top half and the trend analysis on the bottom. Buy and sell lines are clearly marked on the trend analysis graph. A crossing from the bottom buy area into the central zone indicates a buy signal, and a crossing from the top sell area into the central zone indicates a sell signal. For the analysis, you will be asked for the 52-week high and low values of the stock, which are used to calculate the stock's volatility. If you do not have them, however, the program will calculate a volatility based on the data in the file. At this point you are once again given the option of specifying vertical axis information.

System utilities are the last menu option. With these, you may print the graphics plots, save or load plots to or from the disk, change the system specifications for data disk drive, create a data filter for developing data files from "captured" data files, and create a download module for the program *Superplotter*.

The Wall Street Plotter performs as advertised. I examined four stocks over an 84-day period, and examined the buy/sell signals. The program issued the following signals. For IBM, only two signals were issued: a buy at 59 with a sell at 63⅛ some 28 days later. International Harvester issued the following signals in order: buy at 5⅜ sell at 5½, buy at 5⅛, sell at 5, and buy at 3⅛. Bank of America gave a sell signal at 19⅝, a buy signal at 17½, a sell signal at 19, and finally a buy at 16⅜—all over an 84-day period. Tandy yielded these signals: buy at 31¾, buy at 27⅞, sell at 30⅛, sell at 31¾, and finally two buys at 28⅝ and 27⅜. If you were to have acted on the first buy signal for each stock and sold on the first sell signal with transactions of 100 shares each, you would have started with $11,325 and gained $487 over the 84-day period. This is 4% over the period, but does not

take into account any transaction costs (broker fees and the like). Naturally, just because the program produced these results this time, there is no guarantee that it will do so in the future. Use *The Wall Street Plotter* at your own risk.



Real Estate

PROPERTY MANAGEMENT

Arrays, Inc./Continental Software
$495.00
48K; II/IIe

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B	*Value for Money*

Arrays, Inc./Continental Software's *Property Management* system is designed to help automate all of the bookkeeping functions normally required in the management of income property. It is applicable to both residential and commercial properties, and provides time- and money-saving assistance to either the professional property manager or to an individual owner. To begin, the user records detailed information (much of it optional) about each property and all of its rental units and tenants. This information can be printed in several different report formats. These reports show rental unit characteristics such as size, rate per square foot, number of bedrooms and baths, utilities paid for, etc., as well as such tenant information as name and address, telephone, lease dates, rent amounts, alternate mailing addresses, and more.

Each month the standard rental charges are automatically posted to each tenant's balances. Then, throughout the month, the program records a complete transaction history of all tenant charges, deposits, payments, refunds, and write-offs, maintaining current balances for all accounts. There is a complete, printable audit trail for all transactions which take place during the month.

In addition, all property-related expenses, depreciation, and non-rent income may be recorded in a flexible IRS-like income/expense format which can be modified and expanded in order to create custom reports.

Although the program uses double-entry, bookkeeping internally, this is transparent to the user unless he elects to interface with other Arrays, Inc./Continental Software CPA accounting packages. In the latter case, each month the program can automatically receive summary account information from the *Accounts Payable* program (if computer check printing for bills is desirable), and/or transfer summary account information to the *General Ledger* program (for a Balance Sheet and more detailed Profit and Loss Statement).

Many well-organized and readable reports can be printed, with user-selectable variations. These include property and rental unit descriptions, tenant information, rental status, transaction history (audit trail), and an income/expense summary. In addition, the program can produce a formal, accounts-receivable type aging report (with variable aging intervals). It can also print out tenant statements with mailing labels, if desired.

Other notable features include: (1) tenant rent dates may vary throughout the month; (2) tenants who are overdue or scheduled to vacate within some specified period can be flagged in onscreen or printed reports; (3) as an option, late charges can be automatically computed and posted to delinquent tenants; and (4) rent increase dates and percentages can be recorded and printed for rent control purposes.

Accompanying this program is an extremely thorough users manual of over two hundred pages, which includes step-by-step instructions with detailed screen representations, a diagram showing monthly processing steps, a complete set of sample reports, a glossary, and a very complete index.

The following system capacities apply to a 48K Apple with two standard mini-floppy disk drives: a maximum of ten properties, each with a separate set of books, may be stored on a single data disk. (There is no limit on the number of data disks which can be generated.) A maximum of one hundred rental units (and tenants) can be defined for a single property. This means that a single disk can store one complex of one hundred units, or two of fifty units, or ten of ten units. Future versions taking advantage of storage devices with greater capacity are planned.

The program itself is easy to use, although some thought must be given in advance to the organization of accounts. Data input has deliberately been made as easy and foolproof as possible, and the well-organized

menus allow speedy access from one program segment to another.

This program is an extremely useful and cost-effective tool for the professional property manager. However, it can also assist the individual investor with several units of income property by helping him to formalize his bookkeeping habits, with an eye toward greater profitability (e.g. from reduced losses due to misplaced or incomplete information); provide assistance at tax time; or keep investment partners adequately informed. If any of these fit your situation, then Arrays, Inc./Continental Software's *Property Management* system merits your consideration.

REAL ESTATE ANALYSIS

Powersoft
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	B-	*Value for Money*

Real Estate Analysis provides three primary features: (1) Real Estate Analysis Program, (2) Generation of Amortization Schedule, and (3) Generation of Depreciation Schedule. The program provides for a variety of input parameters relating to income property analysis and a meaningful analysis of a selected income property. Input parameters divide into three separate sections—Loan Data, Income, and Operating Expenses. Loan Data has an option for existing or new financing, but does not consider multiple loans. Income includes rental income, yearly increase in rent, vacancy factor, and "other" (remaining combined income). Operating Expenses has an option for lumped operational expenses or detailed inputs. The program set-up makes it easy to change or edit any individual input parameter and run comparative data afterwards. You can display or print the output, which consists of a summary of the data input and an analysis summary of the results by year (the number of years for analysis is open to choice). Analysis includes cash flow before and after taxes, adjusted basis, capital gains, pre-and post-tax proceeds, and return on investment. A set of seven plots is available for display only. You are cautioned to hand calculate the results to help you understand the treatment of the data output. You must also read the documentation very carefully to determine the assumptions made. For example, the depreciation value is 85% of the purchase price; this may be valid for some properties, but not for others.

Sections two and three provide amortization and depreciation schedules and are fairly straightforward.

To sum up, this is a handy program for the individual, but less so for the professional.

REAL ESTATE ANALYZER

Howard Software Services
$225.00
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	B	*Reliability*
Ease of Use	C+	B	*Error Handling*
Documentation	B-	B-	*Value for Money*

Real Estate Analyzer offers you the opportunity to evaluate real estate investments, calculating your financial standing after the sale of the property or at some other point in the future. You must have information about taxes and other operating expenses, plus the ability to predict rates of increase of expenses, income, and property value. Despite some of these apparent shortcomings, the program offers you an accurate way to evaluate simple real estate investments using accurate accounting techniques.

The program disk comes with a bootable Apple DOS system and contains a demo file. The program uses all your entries (income projections, debt service, expense projections, and equity growth) to calculate your return on investment over a period of time you set. It then prints out cash flow and profit before and after taxes for each year requested. You can run several projections on a single property using different variables (such as loan terms), or you can compare several properties. In fact, the only real problem with this program is its apparent sluggishness in calculations. While this may annoy people in a hurry, I don't think it's a valid reason to pass over the program. The organization of the instruction manual dismayed me, because I had to keep flipping between the tutorial section and the subsequent chapters to understand what information the program requires and what the results mean—but eventually I got the hang of it.

Updated yearly.

REAL ESTATE OFFICE MANAGEMENT

Yardi
$295.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	A	*Value for Money*

Yardi's *Real Estate Office Management* system is an accounting system for a real estate office that contains such features as escrow management, general ledger and income statements, agent commission accounts, and a checkwriting routine. The system allows you to handle up to 250 accounts (an account being defined as an asset, liability, income, or expense category). The system also lets you include up to fifty real estate agents and to define a sliding commission split.

The importance of such a program for a real estate office is twofold. First, the office, like any business, must maintain up-to-date accounting information not only in the event of outside audits, but also to know at any time how things are going. It doesn't help if, three months after you went broke, your accountant tells you that things don't look rosy. If there are problems or, conversely, if there are some positive aspects of your business, it is a good idea to know immediately, while you have time to act on the news. The second important aspect of timely accounting is that your financial records can be used as a measure of future performance. For instance, a proven track record for a real estate brokerage might be used as qualifying data for business or personal loans. But a track record can only be established by showing a record of listings and sales for some period of time.

The manual contains some fairly extensive instructions on setting up the system. It assumes that you have a working knowledge of the accounting methods being applied to your office by your accountant. This may not always be the case, so if you have trouble with setting up your accounting system, I would suggest doing a "dry run" first, then making notes of questions you have or of information you cannot find. This will enable you to have a more intelligent conversation with your accountant or bookkeeper. Some items you might ask about are, what accounts need to be set up (this system sets up accounts when it initializes a new disk) and which expenses can be considered "recurring cash disbursals."

On the whole, I think Yardi's *Real Estate Office Management* is well worth the price and recommend it to any small, medium, or large real estate brokerage company.

REAL ESTATE PROPERTY MANAGEMENT

Yardi
$295.00
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	A	*Value for Money*

One of the best features of Yardi's *Real Estate Property Management* is the excellent instruction manual, which not only is easy to read, but contains extensive information about all aspects of the program. The numerous illustrations of input screens let you know at a glance what is required to run the *Property Management* program.

The program is completely menu driven, meaning that each section has a list of alternative functions, which you select by typing the corresponding number. The input screens are programmed so that you just have to fill in the blanks.

I found that the accounting methods and the accounts written by the program follow closely the guidelines established by the Institute of Property Management. The report generation routines create transaction reports for each property, as well as a history for each unit and tenant. Other lists and reports generated include an accounts overdue, a vendor list, tenant list, vacancy analysis, and month-to-date and year-to-date account balances.

One important feature included in the program is the checkwriting routine; it lets you write bank drafts on continuous check forms. This feature is invaluable to larger property management companies that need to write many checks. Since the program has an automatic posting feature for recurrent expenses (taxes, mortagage payments, etc.), the advantages of this feature should be apparent.

The program comes with a self-booting disk, thus eliminating the need to format disks prior to beginning work, which is sometimes a problem with other similar programs. The program is also engineered to create a formatted data disk. To format a disk you need only to insert a blank disk into the data drive; after posting a warning, the system will create a properly formatted disk for data storage.

One other feature worth mentioning is the manual chapter that discusses the systematic backup of data disks. While most other software producers will tender some discussion on the need to keep copies of data, Yardi is the only company I have found that treats the question of backups with an entire chapter in the manual. This may not sound important to you at first, but unless you have lost an entire day's worth of work

because of a machine malfunction, power black out, or bad floppy disk, you don't know how important the use of a systematic backup procedure is to this or any other business using computers.

My only complaint about this program is that it lacks a tutorial with examples of required input. Most of the people who purchase a program such as this will be using computers for the first time, or they will rely on personnel with the same level of experience. Under such circumstances, it is important to provide some type of "cookbook" that can be used to learn about data input and report preparation. The program comes with a demo disk containing example files, but I would like to see another chapter or two in the manual with lists of information used to create the demo disk. While this would increase the size of the manual, it would also increase the overall usefulness of the program to novices.

I believe that Yardi's *Real Estate Property Management* will be an important program in any office, small to large, which either specializes in, or has a department dedicated to, property management.

REAL ESTATE PROPERTY MANAGEMENT II

TOMAR Productions, Inc.
$249.95
48K; II/II+

Overall Rating	B+	B	*Reliability*
Ease of Use	A-	B-	*Error Handling*
Documentation	B-	B+	*Value for Money*

Real Estate Property Management II is one of the better property management programs I've ever worked with. This software is for those of you who own income producing real estate and want to have a straightforward method of saving information regarding your properties (cash, security, expenses, rent collected, and so on). It is software that can be easily interpreted by lay persons and accountants.

Real Estate Property Management II is also useful for small real estate companies and brokers who manage properties for investors, since one can produce income/expense documents for any property in a format that's compatible with whatever information is required on income tax forms.

The main program menu displays four options allowing you to create amortization schedules, depreciation schedules, access the property management program, or end the program. As the names imply, you can create schedules of depreciation (including the ACRS schedule) and loan amortization schedules. The heart of the system, though, lies in the property management segment in which you create files for various properties (housing or commercial units), and store the data in a format similar to that which the I.R.S. requests.

I found that working with this program was fairly simple and straightforward. Data entry was accompanied by enough prompts to facilitate the process of creating files. Information about each business transaction for a specific property is entered and given a specific code. The code numbers set up by the program range from one to sixteen and cover categories like rent, maintenance, advertising, cleaning supplies, insurance, and even computer supplies.

I came across some minor problems with the program. First, the manual should be organized in a more convenient and logical fashion. For example, in order to find information about the creation of a file, I had to read through Chapter Seven in the manual. My feeling is that this sort of information should be presented first, with chapters describing expense data entry, data editing and printouts following.

When you enter the expense data for a file, you need to start with a positive entry, rental income, in order for the Print Financial Reports option to work correctly. In reality, several expenses may be involved with a rental property before you ever get to the first rental income; consequently, this set-up could prove troublesome. The programmers, however, have included a remedy for this problem. If you start the expense entries with a dummy rent income entry of one dollar, this permits the report generator to function properly. It also means that you have to remember to discount all your final figures by one dollar when you have finished. I would like to see this problem handled better, but the program itself does such a fine job otherwise, I'm willing to overlook this one inconvenience.

One other problem with my disk was that I couldn't save the files onto an initialized Apple disk. This proved to be a software bug, but one that TOMAR Productions knows about. If you purchase this program and find that such a problem does indeed exist, get in touch with the vendor and they will give you instructions about replacemnt of the disk. By all means, check out *Real Estate Property Management II* if you are looking for a good property management package for your Apple.

REAL ESTATE TOOL KIT

Yardi
$195.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A	*Value for Money*

Yardi's *Real Estate Tool Kit* is a series of programs designed specifically with real estate sales people and investors in mind. Some of the important features include: real estate investment analysis, including a ten-year projection based on the internal rate of return; a "buy vs. rent" calculation report designed to present the financial advantages of home ownership; a buyer qualification report, which takes into account purchase price, closing costs and taxes, and insurance to present the potential buyer with an estimate of monthly income required to qualify for a given loan; a buyer's closing cost report; an estimate of seller's proceeds; and a tax analysis based on the 1983 Federal tax schedules.

The package itself is menu-driven, meaning that each step in the process of analysis is executed by selecting one of several choices from a list. Client, buyer, or an investor's own financial information, and the important details of a buy/sell transaction are entered into the program through full-screen forms. One of the features I liked is the automatic mortgage calculation. This feature eliminates the need to estimate mortgage costs or to use some other program to make the calculations.

The only negative point I can make about this program is that the authors should have included a step-by-step cookbook detailing the information required to produce a buyer qualification statement or other such report. When I tried to write some of my own test reports, I had to make a few trial runs because the reports produced did not have all the information (client/customer name, etc.) I desired.

Despite the one drawback mentioned above, the *Tool Kit* is one of the best such investment/sales analysis programs that I have seen for personal computers. It compares well with programs used by some local real estate boards through central computer systems. The major advantage here is that an agent or investor need not tie up the multiple listing service computer to obtain these types of analysis. Yardi's *Real Estate Tool Kit* is well worth the price.

VERTICAL MARKET SOFTWARE

Everyone knows that the Apple II family of computers dominates the home and educational markets. Far more rarely does anyone acknowledge that the great majority of vertical market business applications are also written for the Apple II. The Apple II was the first inexpensive, reliable, mass-produced microcomputer, and many programmers rushed to take advantage of its capabilities. Today, when computing is so prevalent, some utility companies equip meter readers with handheld computers dedicated to collecting data for bills. Apple continues to compete successfully in most vertical markets. Even the IBM PC, the business small computer *par excellence*, has not made significant inroads into what has been, to all intents and purposes, Apple's private reserve.

The following section gives some idea of the amazing ingenuity with which software developers are exploiting the Apple as a tool for small but identifiable needs. You can use your Apple as a tool for work in engineering, architecture, medicine, agriculture, and even wildcat exploration for new sources of energy. Especially in agriculture, there is a mind boggling wealth of software available. Farmers can use their Apples to do everything from general bookkeeping to planning what to feed their chickens.

One safe prediction is that there will continue to be more vertical software written for the Apple. The market itself demands more accounting packages modified for the special requirements of certain kinds of business, more agricultural software, more aids to various forms of engineering and architectural design. Hardware and software improvements from Apple, Inc., will also make their computers more accommodating hosts for vertical market applications. The portable IIc can take applications out of the office and into the field, providing highly desirable versatility. Attractive software enhancements include the faster operating system, ProDOS, and the retrofit of enhanced graphics, windowing, mouse-driven software from the Macintosh back to the II family. All in all, we expect to see and review a lot more vertical market software in the coming year.

Vertical Markets

ENERGY MONITOR

Addison-Wesley Publishing Co.
$245.00
48K; II/II+/IIe/IIc

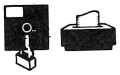
Overall Rating	B-	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	D	*Value for Money*

This program for professional energy managers handles energy use and conservation for one to ninety buildings. It provides a method to develop a database on energy use and has a number of output formats to generate meaningful reports about energy use. *Energy Monitor* needs data about the buildings you want monitored, plus the actual amount of energy used in each building. Data on the buildings includes name, square footage, and the number of occupants. You enter data about outside temperatures in the form of "degree-days," a standard method of measuring the variation of the temperature around an average value for each month. Data concerning energy use comes from monthly electricity, gas, or oil bills. You can enter this data, which includes demand charges and rate adjustments for electricity bills, in a variety of formats.

The report formats available include building energy management, electric use by month, oil use by month, gas use by month, percentage energy use by month, and building energy efficiency. The well done reports provide a plethora of information, helping you compare energy use in a building from one year (or month) to another. You can even change the fiscal year.

The excellent documentation explains everything well and discusses examples of the reports. A glossary helps explain such terms as "degree-days." The program cannot stand without the documentation.

Although professionally done and worthy of good marks, the program falls down in the Value for Money category. The list price of $245 seems truly astronomical for the kind of programming that has gone into *Energy Monitor*. Nothing in the software is difficult to write. The documentation (a small book) would sell for $15-$20 in a bookstore and probably took as much effort to produce as the software. Is the price so high solely because the program targets professional energy managers?



GUSHER

High Technology, Inc.
$1,495.00
64K; II+/IIe with 80-column card

Overall Rating	B	B+	*Reliability*
Ease of Use	B-	B+	*Error Handling*
Documentation	B	B	*Value for Money*

Gusher is intended for small to very small independent oil operators; it handles up to 100 owners per well or unit. This program tracks expenditures on oil and gas wells, organizes billing to the various paying owners (working interest or capital interest owners), and distributes the revenues of a producing well to the owners (revenue interest owners).

High Technology specially designed the program to eliminate the more common accounting problems encountered by an oil and gas operator, including:

Determining and printing joint interest statements for working interest owners.

Determining revenue distribution from production runs.

Writing checks (using your checks) to each revenue owner, prorated according to his interest and the windfall profits tax.

Generating well payout reports.

Determining and printing A.F.E. (Authorizations for Expenditure) reports.

Keeping track of the balances of revenue owners and working interest owners and the payments of working interest owners.

Generating 1099 reports, giving the amounts of gross production, production tax, and windfall profits tax paid to each revenue interest owner.

Writing checks to pay invoices from vendors, indicating the wells to which the invoices were posted

and tracking how much has been paid to each vendor (up to 60 vendors and 1,200 invoices per well or unit).

You make each entry only once in this easily used program. *Gusher* saves each entry and uses it whenever needed. For example, when you receive an invoice from one of your vendors, you type it in and choose the expense category to which it applies. Later the program applies the invoice to the check the computer writes to the vendor, the well payout status report, the A.F.E. report, the joint interest bills to the working interest owners, as well as several other reports which *Gusher* generates.

Gusher tracks leasing packages containing from one to fifteen wells. Each leasing package becomes a unit capable of handling an unlimited number.

For your convenience, *Gusher* comes with fifty-three of the sixty possible expense categories already defined, but you can customize expense categories to meet your own needs and to conform to your bookkeeping system. Accounting information is readily accessible. The reports provide useful information in a highly organized, condensed form.

High Technology has recently instituted a new policy that requires you to pay an annual subscription fee for support. You have telephone access to the vendor for ninety days following registration, but after that you must pay $120 a year for telephone access, software upgrades, and unlimited disk replacement of damaged disks. The telephone support, offered between the hours of noon and 4 p.m. Central Time on weekdays, constitutes a disadvantage. You should evaluate this unusual support policy in addition to the software; you may find the software acceptable and the maintenance policy unacceptable. Personally, I feel that High Technology has taken a reasonable stand for their comprehensive product.

The poorly organized user's manual contains specific notes on the Apple and IBM in an appendix at the back. It also makes several references to the error codes in the Pascal manual, which many of you may not have. You should try the program in a working situation. If your operation is small but moderately complex, *Gusher* could help you. Note, however, that because of its price and specialized nature, the program is available on a very limited basis.

THE HURRICANE TRACKER

Climate Assessment Technology
$34.95
48K; II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

To borrow the words of its originator, *The Hurricane Tracker* was developed for the owners of microcomputers who wish to use their hardware for the task of tracing tropical storms." This is precisely what the program does. Given certain data about the storms, the program is able to give you detailed information about the likely development of the particular hurricane.

You can use *The Hurricane Tracker* to follow the path of a hurricane and keep informed of how far it is from the city in which you live. In fact, if you live in a state bordering the Gulf of Mexico, or somewhere in the Caribbean, or on the eastern coast of Florida, you can do this via the graphics of a map of the Gulf Coastal Region provided with the program.

If you want to track a storm in this region, you follow the easy to use menu for the program to establish a new storm file. This is done by responding to the cursor's prompts. You will be asked to give the storm's name, the time and date of each entry of data, the latitude and longitude of the storm, and its pressure. (All of this information can be obtained from the National Weather Service.) If the storm is within the perimeters of the program's map, a circle will appear showing the storm's current location.

After the storm file is initially set up you feed data periodically to the computer as long as the storm is alive. You do this by responding to the same prompts that you used to establish the file. As you continue to update your file, you can watch the path of the storm as it moves across the map and you will be advised of how far the storm is from your city.

In addition to information that you put into the files on new storms, *The Hurricane Tracker* comes complete with the tracks of five classic storms that have hit the U.S. coast in the past twenty-five years. Each one of these storms has with it a complete set of data so that it may be compared to any new storms that the user might track. These storms can also be plotted on the program's reference map by simply pressing the letter "T."

As you continue to build files of various storms, the information is saved on your diskette until you either copy it or erase it. You can at any time review a storm file just by asking for it by name. Also, each time you review a file you have the option to see its path displayed on the map.

When you first receive the program you need to go into the utility sub-menu to change what is called the reference city. This is the city upon which all calculations of distance are based. Every time you make an entry you are advised of how far the storm is from the reference city. In most cases this would be the city in which you live. To change the reference city you need only supply the name, latitude and longitude of the city that you want to be the new reference point.

Also on the sub-menu is an interesting section which reviews storms and how they are categorized. This is based on the Simpson/Saffir Damage Potential Scale. Hurricanes are categorized into five levels depending on the potential wind and storm surge damage. There is a brief description of each category and what you could expect to experience in the way of damage with each. These range from level 1 with winds starting at 74 m.p.h. to level 5 with winds in excess of 155 m.p.h.

Although the same company produces both *The Hurricane Tracker* and *The Weather Analyst*, the former is much more limited in scope. It does have, however, the same ease of use and well-formatted menu. If you live in the hurricane belt, you should think about buying this program.

LONG-TERM RESERVATIONS

Market Computing
$100.00
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	C+	B	*Error Handling*
Documentation	C+	C-	*Value for Money*

Long-Term Reservations helps you take reservations for facilities far in advance, backs up your calendar of reservations, keeps track of whether people have paid yet or not, and generally just helps you keep track of things. It was designed to enter reservations for any number of different facilities that require long lead times and variable time periods. You can reserve time frames and facilities at any date in the future merely by typing in the information as requested. A single data disk holds up to nine hundred days' worth of reservations for fifty facilities and six hundred organizations. If this isn't enough, change disks as requested by the program and continue.

You can print out a reservation permit describing all of the pertinent information. You can call up a file to add reservations or print out mailing labels. When you make repeat reservations, you need only enter the information the first time. After that, just repeat the other dates and the program completes reservations for those dates as well.

Most sectors of the program use an 80-column printer. You can print out the reservation permit on half a sheet of paper, or list the organizations, money received, and future reservations. One of the internal options even supplies mailing labels.

The only problem I encountered was the program's speed—or rather, lack of it. If you enter a reservation for a few days in the future, the program takes thirty seconds or so to process the information. When you enter a reservation for a month in the future, the program may take five minutes or more. Although aggravating, you can live with the delay because of the time saved by the other options.

SHORT-TERM RESERVATIONS

Market Computing
$100.00
48K; II/II+/IIe/IIc

Overall Rating	C-	C+	*Reliability*
Ease of Use	C-	D	*Error Handling*
Documentation	C	D	*Value for Money*

Short-Term Reservations was designed for organizations that reserve facilities such as tennis courts, practice fields, or baseball diamonds for short periods of time. You can enter up to twelve time periods per day for a two week period. The information stored on disk includes up to sixteen facilities for adding or changing reservations. Switching data disks makes possible further additions, permitting unlimited facility reservations. You can also print out a reservation permit describing the place and time plus the person reserving the facility. This permit serves as a confirmation copy, as well as a reminder. Unfortunately, it prints out in a format measuring three and a half by four inches, which won't fit on a standard file card and really doesn't look very professional. You can also print out a schedule for any facility, showing all time slots, reservations, and contact names and telephone numbers for the entire two week period.

Even though the program was designed for use by schools and other organizations, I recommend that only one person learn and handle it because of its peculiarities. These range from minor problems to more important ones. Let me elaborate. Many times the program requests "Y" or "N" responses. Most of the time, everything works correctly, but other times, hit-

ting another key drops you into the "No" option. Another problem crops up if you enter the wrong date while updating your files. The program tells you that you messed up, but still changes the files to coincide with the wrong date. If you mistakenly choose the delete section, you must either delete a file or turn off the computer and start over again. The documentation advises you not use the colon, yet says nothing about other characters (like the comma) that bring the "Extra Ignored" message to the screen. On top of all that, this program is *slow*. Because of the length of the text files used, even a standard entry takes close to a minute to save to disk. Normally this wouldn't cause problems, but can you imagine the delay if you need to make five or six reservations for one party?

All in all, I think the idea's great, but the work behind the program seems rushed and less than expected. The author should have spent more time on making the program easy to use and more forgiving. If you want to take the time and get used to the program, you'll cut down on your paperwork, but I'm not sure how much time you'll save. It makes nice listings, but for the price, it should do more than that.

SUNDAY 1.4

Ecotope
$300.00
64K; Apple II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	D	C-	*Error Handling*
Documentation	A	B	*Value for Money*

Now, let's see. You live in Spokane, Washington. You want to design a house that will use the least possible amount of energy. Assume you want a large double window facing southeast at an angle of 75 degrees, with a total of 200 square feet, double glazing with a cavity absorptance of 0.92, a U-value of 0.57, no fixed shading, and a light curtain for movable shading. Now you need to find out if you should change to a smaller window or add the fancy fixed arbor for shading. Sounds quite in-depth, doesn't it? You've only begun....

First, as you've probably guessed, this program hardly suits amateurs. It is recommended for people interested in designing their own homes or for professional architects or construction experts. Someone who works in-depth on a building project (or better yet, projects) could answer the questions the program asks and could use it on a continuing basis. A working knowledge of Pascal would facilitate your use of *Sunday 1.4* because it uses some of the screens and menus of UCSD and Apple Pascal.

After following the instructions on setting up your data disks, step-by-step instructions lead you through the entire procedure for a test run on a simulated house/structure. You must enter data on such things as number of windows, R-value of the insulation, heating/ cooling set point temperatures, and so on. When you have answered all the questions, you return to the beginning and choose whether or not to enter another building description. You can store up to ten building files on disk. You can also take a particular file, modify it, and run the simulation. When ready, you can run the main part of the program (which accepts weather data for one of the 237 sites available). After loading it, the program presents you with either screen displays or printed hard copy. Because the program stores all information to disk, you can employ the appropriate program to plot or print out the data in graph form.

The appendices at the back of the book supply you with a wealth of information, including sample houses with floor plans and drawings, plus filled out work sheets. You can step through each while following the computations. Sample floor plans range from a small single zone structure to a multi-level home, showing how to find multi-zone figures. This section definitely helps you understand the documentation.

I think I should clarify some of the points touched on. First, the solar/weather data comes in disk form. The disk that comes with the program covers Seattle, Spokane, Portland, Missoula, and Albuquerque. The data consists of readings taken from two to four times a day for a year. You can get other sites (five per disk) for an additional $100. You need to contact Ecotope for more information on the geographical areas that interest you. Second, extensive instructions in the manual help you estimate or define the information requested for each building. Last of all, *Sunday 1.4* is compared to other systems presently in use in the selected area, showing the ease, speed, and accuracy of this method. Methods compared range from SLR to hand calculations. *Sunday*'s computations nearly match actual energy requirements.

This program is not easy to work with, at least at first, mostly because of the operating system. Once you have learned the program, however, the time saved will more than pay for the program as it helps you work up possible alternatives in construction. The needs of the consumer and the conservation of energy have been spliced together to make a package that presents both to the best advantage.

TELOFACTS2

dilithium Software
$199.95
48K plus language card (II); 64K (IIe)

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

This is a program to help people who conduct surveys, questionnaires, tests, polls, or other analysis systems. As such, it serves a specialized function, but should still appeal to those whose jobs involve the gathering and analysis of information. It is modestly priced and can be used by anyone—from a professional campaign manager conducting statewide popularity polls, to a graduate student working on a thesis involving questionnaires.

The program does exactly what it claims and does it nearly perfectly. Although it can run with 40 columns, a single disk drive and no printer, it operates best with an 80-column card (which it searches for automatically when booted), two drives (which eliminates disk swapping) and a printer. The system also responds to the one-wire lowercase modification on the Apple, enabling you to switch between upper- and lowercase using the Shift key. This is not mentioned in the documentation, although you could probably figure it out quickly enough.

The system is easy to use and completely menu-driven. The menus utilize simple, consistent commands, which are usually displayed at the bottom of each screen. The commands let you create, change, and save a questionnaire of up to 100 questions with five possible answers for each question. Answers can be weighted so as to guage their importance. The answers can either be typed into the program from written questionnaires, read into it using the Mountain Card Reader (a device which reads "mark sense cards"), or entered directly onto the program. This latter approach can also be used for telephone surveys, with the person conducting the survey entering the answers on the computer as they are given, saving endless hours of data entry time and making analyses of answers available within minutes of completing a survey.

The program then performs several types of analyses on the data. Means (averages), medians, and standard deviations are instantly computed, as well as the number and percentage of respondents who choose each answer. These analyses can be performed on the entire questionnaire or on individual questions. It is also possible to perform analyses using only partial responses. For instance, the user can study the reading habits of women over 35 who shop regularly at Neiman-Marcus.

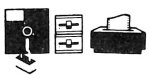
Results can be scored and respondents ranked. This makes the program useful for administering tests or compiling personnel databases. Lists of people meeting certain criteria can be created. The actual uses are much wider than are first apparent, and the publishers welcome correspondence from people who have put the program to new and unusual applications. I thought of one myself: a survey for a change of venue motion in a criminal case which has received sensational publicity.

The documentation is the best I have seen. The program comes in a very attractive three-ring binder. The writing is clear and thorough, without being childish or condescending. The manual is divided into Installation, Tutorial, Reference, Glossary and Index sections—separated by tabs. A Table of Contents is provided for each section and the Index is complete. I found no typographical errors. Even a quick reference card is included, and the installation section is clear enough for a beginner. The tutorial is excellent, guiding you from the initial step of creating a questionnaire to analyzing the data in every light. There is even reference to a book on setting up and conducting surveys.

There are just a couple of bugs in this program. The manual instructs you in setting up printer codes and allowing for the Card Reader. This requires writing on the program disk. However, the disk provided did not have a write-protect notch. My printer (an Epson) nevertheless worked perfectly. The toll-free number provided a quick solution to the problem. The program is copyable, so the answer was to make a copy onto a disk which was not write-protected. The bonus of calling was finding out that I could make my own backup copies; this is not mentioned in the documentation.

Another problem was that I couldn't discover a way to print out a questionnaire without answers on it. The closest I could come was printing it out with no responses. This means that if a written questionnaire has to be prepared, it would have to be retyped using a word processor or typewriter. Maybe I missed something, but I was unable to find any instructions in the manual for printing out only the questions. These, however, are minor errors in an otherwise nearly perfect program. As indicated, the publisher provides a well-staffed, toll-free hotline. In addition, when the registration card is sent in, you receive a free backup disk.

This program does a specialized job, does it very well, is easy to use, and is moderately priced. What more could anyone ask for?



THE WEATHER ANALYST

Climate Assessment Technology
$89.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	N/A	*Error Handling*
Documentation	A	A	*Value for Money*

The Weather Analyst is an excellent program that appeals to hobbyists, educators, and anyone else who has a need for accumulating detailed weather data. (Note to teachers: In addition to the science class where you would normally expect to find a study of the weather, I would recommend the program to math teachers because of its outstanding format for compiling and sorting data.)

Although *The Weather Analyst* deals almost exclusively with precipitation and temperature, it does so with a wide variety of approaches. Data is entered in the form of daily high and low temperatures and daily precipitation. The data is easy to enter and edit following the menu-given directions. Once this data is entered it can be recalled in about a dozen different formats.

You can call for the current month's temperature and precipitation and get not only the daily readings but also a monthly summary. Or, if you prefer, you can go back to a previous month for daily temperature and precipitation. You can also obtain a summary page which includes average highs and lows.

One of the most outstanding features of the program is the custom made interval summary. With this capability you can go back during the past year and ask for a custom-made summary report on any block of time from one day to 365 days. For example, the dates used for this test were 4/24/1982 to 5/30/1982. As soon as I entered these dates and pushed the return key, the computer started readings. Within a few seconds the screen display noted that I had asked for a report over a thirty-seven day interval and proceeded to show me: 1) the total precipitation for the period versus the normal for the same time; 2) how many days included precipitation; 3) the greatest daily amount of precipitation during that period; 4) the average temperature versus the normal; 5) the highest temperature of the period compared to the average; 6) the lowest temperature compared with the average; and 7) the number of heating and cooling degree days. The program's ability to compile this information on any given time period within the 365 days is very impressive. It's a shame that it doesn't also track such relevant weather data as barometric pressure.

Another feature of the program is its graph plotting ability. You can have a well formatted graph of daily temperatures for an eight month period, or graphs showing summaries for the year of either temperature or precipitation.

One last feature of the program unique to different geographic regions is the weather data dating back to 1951 that is part of the internal files of *The Weather Analyst*. With this information you can pick a single year or a range of years and find the total precipitation, average temperatures, and departures from the norms of each for the time period you have requested. Unfortunately, the documentation does not specify whether this data is gathered on a local, regional, state, or national level, or where it is measured.

The Weather Analyst comes with fourteen pages of documentation, but because of the ease of operation of the menu-driven program, a person would have little difficulty in using it even without the booklet. This ease can be of the utmost importance in the classroom where many of the users of the program are not always skilled in the use of computers.

WORKER'S COMPENSATION RETENTION ANALYSIS

Compu-Risk Software
$165.00
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

Worker's Compensation Retention Analysis belongs to a series of insurance-related analysis programs available from Compu-Risk Software. This program produces true cost projections for one or more workers' compensation plans, using present value computations and cash flow analysis of the various retention plans offered. Because of the complex calculations for retention, loss conversion factors, reserves, cash flow payment plans, and the difference in definitions of contract terms offered by each insurer, all new insurance agents should find this program helpful. More experienced agents should find it a time-saving convenience. Corporate risk managers might like it also.

To use this program successfully, you need the estimated standard premium of the various plans; the current cost of capital; the various tax multipliers if applicable; and the important statistics from the insurance company, such as retention factors, loss conversion factors, deposit premiums, incurred but not reported factors, and the time periods for payment of potential dividends. You also need to know what percentage of

these dividends will be paid after each specified time period. Top that off with a reasonable estimate of the insured's expected losses and you can produce an accurate representation of the true cost of a particular plan.

In my opinion, this program makes a good but not great insurance management tool, particularly for the computer novice insurance agent and company risk manager. You could reproduce each of the functions of this program using a good spreadsheet and a few hours of set-up time—assuming you know what figures you need to compile the comparisons. If not, then you need this program.

Medical

APPOINTMENTS

Andent
$75.00
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	B	C	*Value for Money*

Appointments is a simple and effective tool for organizing and entering medical and dental apointments. The menu lets you configure the system to your specifications, including patient name, starting date, beginning and end of scheduling times, length of appointments, and number of characters to print per entry.

After configuring the system, you are returned to the menu. By selecting the Appointments option, you will be able to enter appointments, delete appointments, enter comments for a day, search for a name, move appointments to specific dates, store appointments, or scroll day-by-day. You are also given the option of deleting dates which have passed.

Missing is the capacity for multiple users to share a file. Nor does the program contain the option of searching by day of the week. Two days are displayed on the screen at a time, but only if they total fifteen characters. This severely limits the amount of data which can be stored on an appointment screen, since many medical and dental practices store the type of appointment, record number, and the phone number of the patient.

The disk contains documentation, which can be displayed on the screen or printed. This documentation is generally clear and complete. Because the options on the Scheduling menu are accessed by single-letter entries, a help screen, accessed by the "h" key, is included. The documentation must be read from the beginning. If you read it from the screen, you will probably need to completely review the documentation. If you exit from the Appointments option or instructions, you get the Applesoft prompt rather than the options menu.

Appointments is an adequate appointment scheduling program for small medical and dental practices.

MEDICAL INSURANCE FORM WRITER

Andent
$100.00
48K; II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	B	C-	*Value for Money*

Medical Insurance Form Writer is a simple program designed to fill in printed universal medical insurance forms. It is not easily modified for other forms without changing the Applesoft listing. The documentation is clear and concise, if a bit brief.

The program boots to a menu. The first menu option allows the user to enter names and other essential information about those who will be using the system to write bills. This information is stored in a text file so it can be retrieved for later use. The user is returned to the menu at the end of this process, from where he or she can enter billing on specific patients, which again is stored in a text file. The next menu item allows retrieval of stored information. This process will be slowed as the number of billers and patients increases, because the program is written in Applesoft. The forms can be printed using another menu option.

Effective error-trapping is evident throughout the program: all information is checked after it is entered, and a nice print alignment format ensures that the preprinted forms on which the patient date is to be entered are properly aligned.

However, there are many unfriendly features. Once the user chooses to correct items, the whole screen must be reentered. There is neither provision for acceptance

as a default the previously entered information, nor any way to chain or link files. No sort functions are provided.

Medical Insurance Form Writer does what it says it will do, but the awkwardness of some of the features will disappoint most users.

PRESCRIPTION FORM WRITER

Andent
$20.00
48K; II+/IIe/IIc

Overall Rating	D-	D	*Reliability*
Ease of Use	D	D	*Error Handling*
Documentation	C	D-	*Value for Money*

Prescription Form Writer is designed to automate the prescription process by printing completely filled out prescription forms, which include, of course, the prescribed medication. It sounds like a good idea, but in fact this program is not the remedy for the perennial problem of what to do about Dr. Pavel's illegible scrawl.

Booting brings the user to a title page, which is followed by a menu and an exit to the Applesoft prompt. This is an antiquated, if user-friendly, boot system. The menu contains a file of instructions. The instructions exit to the Applesoft prompt without displaying a submenu.

To print prescriptions, the user must load the main file, modify the listing to change the name of the user and the address, and save the file back to disk. This is a cumbersome and unnecessary system for making these changes, although a nice touch is provided by the inclusion of the original file in a locked form on the disk.

Once these modifications are made, the user can print prescription forms. The form contains the address and name of the prescriber as well as the state license and DEA numbers. The medication name, dosage form, quantity, and instructions can be entered. There are blanks for the name of the patient, date, and substitution/no substitution, however, these cannot be input on the computer. Also, there is no space on the form for the signature of the prescriber.

After checking that the entries are correct, you can print the form, but not without a struggle. The program as distributed would not print because slot 2 was specified for the printer. Almost every other program uses slot 1. Although the modification is simple if you know what you're doing, this is another inconvenience for the user.

Finally, it is difficult to see why anyone would want a prescription form writer that does not store any data. Certainly it is easier and quicker to write out prescriptions by hand.

RECALL LIST

Andent
$39.00
64K; II/II+/IIe/IIc

Overall Rating	D	C	*Reliability*
Ease of Use	D	D	*Error Handling*
Documentation	D	F	*Value for Money*

Although this program claims to be a medical and dental recall program, it is really a primitive database with recall and address lists as files. The program boots to a menu that lists the active files with additional options to add or delete files. The file (erroneously called "program") can be renamed.

Selecting a file leads to another menu that offers the following options: select records, add records, change records, delete records, list records, search, sort, print, report, add fields (called headers), change fields, delete fields, or quit. The options that deal with record selection work in a straightforward fashion, but they do not offer sufficient error-checking after data entry. The search option is a multiple-level simple sort that is very slow. The print option is set for the Paper Tiger IDS printer only. Also, the only way to modify the printer commands is to change the program listing. This is possible, since the program is unprotected but cumbersome. The report option allows a simple columnar format, with the option of adding new formats. There is no option for non-columnar reports. The field options are straightforward and simple. The exit option exits to the Applesoft prompt and does not let you return to the menu for file selection and generation without rebooting. The maximum allowed size of the files is quite small, only 180 records.

The format of this application of a database program can be replicated on much more powerful and better-designed databases. *Recall List* is much too limited for use in professional offices.

Agriculture

AGRI-LEDGER

Small Business Computer Systems, Inc.
$550.00
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	B+	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	B	*Value for Money*

The complete *Agri-Ledger* package is menu-driven and includes a comprehensive, well-written manual and four disks. There are two program disks (one for use as a back-up), a data disk, and a cash flow template disk for use with *VisiCalc* or *MagiCalc*. Nearly all aspects of the program are user-defined. For example, you may use the program's account codes, or assign your own. You may keep records for only one farm, or up to twenty-six different farms. Each farm may have as many as 99 different enterprises, although the basic 48K Apple hardware setup will support fewer than six hundred different accounts.

Agri-Ledger provides seventeen report titles, most of which have several user options. The Schedule F report provides complete information for your tax return, including line numbers. You may select the report for a single farm or enterprise, or several. In addition, reports are available on a monthly, quarterly, or yearly basis.

Probably the biggest problem with *Agri-Ledger* is that it uses a double entry accounting system which requires extra time and effort. Another problem, or limitation, is the difficulty in setting up account codes. Changing account codes is a chore in this program. Finally, enterprise analysis is limited to financial analysis only. This program does not attempt to tackle feed conversion for the hogs, the calving interval for your cow herd, relative fuel consumption for machinery combinations, or related questions, unless you are willing to settle for answers only in dollars and cents.

As for error handling, the program is designed to test your entries. If the entries are inappropriate or out of a given range of possibilities, the program will not accept the entry. If you do make an error and press the Return key, you must complete the entire entry before you can correct it. I found this a very distracting feature. However, all mistakes can be corrected at the end of each screen you enter, or edited at a later time.

As a farm accounting system, *Agri-Ledger* is well designed. The documentation is simple yet thorough. The practice session takes you through enough of the program options to acquaint you with its features, and the well organized manual has detailed explanations for every option. The index is good, but many key terms are omitted. The "Accounting Terminology" and "Glossary" are nice added touches.

SBCS offers a jewel of a warranty. It is written in plain English, and promises that SBCS will fix the program or replace it as long as you don't abuse it. It promises free updates, and guarantees a provision for converting data to the update. Many free program modifications are offered in the manual, and SBCS suggests that other modifications will be made at a modest charge if so required by your operation. Also, SBCS offers a very good demo plan. For $30.00 you can order the demo and decide if this program will fit your needs. The $30.00 applies to the purchase of the package.

It would be difficult to find a better farm-oriented double entry accounting system for your Apple, and the demo disk lets you judge the program's usefulness for a very modest fee. SBCS provides excellent customer support. Their pride in their program appears to be well-justified.

AGRI-LEDGER IIe-IIc

Small Business Computer Systems
$550.00
48K; Apple IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

Designed for use on the Apple IIe computer, the menu-driven *Agri-Ledger* includes a comprehensive,

well written manual and four disks: two program disks (one a backup), a data disk, and a cash flow template disk for use with *VisiCalc* or *Magicalc*. You can keep records for one farm or any number up to twenty-six, each with as many as ninety-nine different enterprises, although the IIe will only support five hundred different accounts. User-defined elements add flexibility to the program; for example, you use the program's account codes, modify them, or assign your own.

Although a double entry accounting program, *Agri-Ledger IIe-IIc* permits you to use a Transaction Entry Module, simplifying things for those of us not trained in accounting. Transaction Entry lets you account for checks and deposits, and for purchases and sales. The second entry screen lets you use default values, with the date from the first screen entered automatically and the amount and description taken from the original entry with a touch of the Return key. For those trained in accounting, Journal Entry operates with the debits and credits customary in standard accounting systems. Either module lets you split single transactions into as many as ten different accounts with Transaction Entry or unlimited accounts with Journal Entry. For example, a payroll transaction might involve not only your bank account and the check to your employee, but three tax accounts (FICA, federal and state income taxes). Each entry accepts two quantities with no restrictions on the units of measure except that the abbreviation used not exceed three letters. Consistent abbreviation for an account lets you generate a total amount on the update report, but any deviation in a field's label automatically turns this feature off.

Agri-Ledger IIe-IIc provides the same seventeen reports as the regular version, but allows you to display them if you have an 80-column card in the expansion slot. The program helps you set up a budget, then provides reports comparing performance with projected performance. The reports also include balance sheets and detailed income statements showing current and year to date figures for income and expenses. Moreover, each account shows income and expenses as percentages of total income. The most valuable report, in my opinion, is the Schedule F Report, which computes your farm tax data by IRS line number. It may save you the cost of the program all by itself. I found nearly all of the reports flexible, letting you choose one farm and one enterprise or any combination up to all of them. You can also generate monthly, quarterly, or annual versions of the reports.

Error trapping is excellent. The program tests your entries and provides displays for you to check yourself when the computer doesn't do it for you. You have ample opportunity to correct entry errors, although you must wait until you have completed entries to the screen. Otherwise, you can easily correct errors at any time after entry unless you have closed the books and generated reports.

Agri-Ledger IIe-IIc has the best program documentation I have ever seen. The practice session walks you through enough of the program options to get you comfortable with the program, and a well organized, tabbed manual provides detailed explanations for each option. Finding an index in a manual for a farm program delighted me, although it could benefit from greater detail. I also liked the addition of a section on accounting terminology and a glossary, plus the brief comments on the benefits of different methods of accounting. Added to all this is a jewel of a warranty, written in plain English, that promises free repair or replacement of the program as long as you don't abuse it. It also promises free updates, including exchanging your II+ version for the IIe-IIc version, and a guaranteed provision for converting data to the update. The manual offers many free program modifications, plus others for a modest charge if needed for your operation. If your dealer cannot give you the help you need, the company invites you to phone them directly. An outstanding demonstration plan allows you to order complete documentation and a program disk restricted to entries for two months for $30.00, that amount applying to your purchase if you decide to buy the program.

All in all, you will probably find that you invest less time than you expected in using this double entry program, with the advantage of obtaining the security guaranteed by true double entry. You spend more time in setting up the codes at the beginning, but little more time in data entry later. I should point out, however, that although *Agri-Ledger IIe-IIc* does an excellent job of handling financial matters, it does not track such things as swine feed conversion, calving interval for the beef herd, or relative fuel efficiency for your equipment. Look elsewhere for those functions. Nonetheless, I have used several farm accounting programs on various types of computers, and of them all, I judge *Agri-Ledger IIe-IIc* to be the standard by which you can judge the others.

DEPRECIATION LOG

Harvest Computer Systems, Inc.
$175.00
48K; II/IIe

Overall Rating	B-	B	*Reliability*
Ease of Use	C+	C-	*Error Handling*
Documentation	B	B	*Value for Money*

This menu-driven program helps farmers and farm accountants track and report depreciation, investment credit, investment credit recapture, and related information. It keeps records for 900 items on a single floppy disk and has been successfully tested with one brand of hard disk. Despite areas needing improvement, I found *Depreciation Log* easy to use. The screen keeps you informed of the computer's activities and owners of Apple IIe computers can take advantage of most of that machine's special features.

In addition to the basics, *Depreciation Log* allows you to assign an enterprise category to each item. As a result, you can get a "Recovery by Depreciation Category" report. The enterprise categories also enable the program to provide information for interface with *Farm Analyst II*, also from Harvest. You get ample opportunities to make corrections, both during entry of data or later. Although not the same as the routine in *Farm Ledger*, the program offers an excellent Search/Edit routine.

Harvest values customer support, as illustrated by the previous edition of this program. The company offered owners of older versions the update for $15 if they purchased early, with a regular update price of $25. Since tax laws change, it is important to know that this kind of support will be available in the future. Harvest also offers to repair your data disks for only $5, no charge if they fail to fix it or if the problem resulted from their program. The company supplied the current version to owners at no charge because it corrected a couple of significant errors.

Although I found no major bugs in this version, it still did not achieve the standards I expect from a top software supplier. For example, DOS was changed on this version. It will not accept file names that include a space. This could cause a serious problem if you had an old data disk that included two or more files with the same first word. From my viewpoint, the errors are not the critical point, but the pattern of similar errors represented. As I review Harvest programs, it becomes apparent that they rush to get the next revision or next program to the market. In that rush the final product often has bugs which may cost Harvest customers hard cash. In some cases, sample reports show that the program did not have the error when tested; somehow it slipped in during a later stage of development. Harvest needs to undertake a thorough product review before the package leaves. If they don't begin doing this soon, this fine software supplier may ruin its reputation despite their excellent ideas and very good customer support.

The program contains an annoying fault: it lacks a proper routine to operate a two drive system. When the program calls for data from the data disk, the message "Insert data diskette in slot 6 drive 2 and press return" appears on the screen. Once the program has accessed the data disk in drive 2, it should recognize the disk's presence automatically. The failure to do so keeps your attention on the computer unnecessarily. (This was improved in the current version.) In addition, the error checking routines lack consistency. Most of the time, when you make an error the computer beeps and displays a message. Other times it only displays a message, which you will miss if not looking at the screen. At times the computer beeps but doesn't let you know why. No matter how obvious the error seems to the programmer, the program should display the message. Other annoyances include the requirement to enter five zeros as the item number in order to get back to the menu. Return on a blank line will not do, nor will one or four zeros. You must enter five—count 'em—five zeros. Also, over half of the questions in *Depreciation Log* require one-key answers. Using the Apple's Get command would save lots of Returns.

The program includes other annoying inconsistencies. First, during most entries, if no entry is essential to a question you can just press Return; however, at times an inverse prompt appears on the screen telling you to use Control-B. Experience has shown that Return works just as well. Second, while the computer handles the slash marks in the date, it does not handle the dashes in the social security number. You must re-type the dashes. Third, when faced with a Y or N choice, you can always press Return and get a default value. This can be Y, N, or a return to the previous menu. The program should always give the same default, or have one displayed under the cursor. Fourth, when you tell the program that you want to take investment credit on an item, it usually asks "REDUCE RECOV BASIS (Y OR N)." Unfortunately, once in a while it fails to ask.

Commendably, Harvest has attempted to get a broad spectrum of programs available from one supplier. In their rush to do this, they have failed to adhere to one of the best features of the concept: consistency. For example, in their *Farm Ledger* package you make menu selections by number, while in *Depreciation Log* you choose a selection by moving arrows with the cursor movement keys.

Despite the criticisms, *Depreciation Log* remains above average. I have told you what's wrong with the program, leaving it to the ads to tell you what's right. I hope that Harvest will slow down, standardize, and

streamline their software. They could well become the industry leaders in farm software if they do.

FARM LEDGER PRO

Harvest Computer Systems
$425.00
48K; II/IIe

Overall Rating	C+	C	*Reliability*
Ease of Use	B	D	*Error Handling*
Documentation	C-	C-	*Value for Money*

Farm Ledger Pro combines two previous Harvest programs, both expanded substantially, in a menu-driven, modified single entry farm accounting system for the family farm. If a report needs double entries, the program makes automatic offsetting entries. It can read inputs from other Harvest programs, such as *Depreciation Log*, or stand alone. You probably won't need the other options available, but if you do, you can purchase an "Enterprise Analysis Module" for an additional $75 and a "Report Expansion Pak" for $50.

The original *Farm Ledger* sorely needed a balance sheet, which this program adds. The balance sheet is very good, although some of the problems mentioned below affect it. The program still lacks a schedule F report. Its main attraction is the ability to assign five-character names to your accounts (now called categories) rather than numbers. You can have up to eighteen income and thirty-two expense categories, each with up to six subcategories. This allows a total of three hundred categories (accounts), which may not be adequate for large operations or those who keep highly detailed records. The program also handles up to eight checking accounts, keeps a register of each, prints checks for each, and reconciles each when bank statements arrive.

To enter more detail in your records, you can "tag" the person or description field of an entry. However, unless you keep a list of the tags you use, you end up making little errors that cause big problems in your records. For example, if you farm the Laughtenslager place and tag those entries /LTSLR the first time and /LTSGR the next time, the computer identifies the two as separate tags. After a few errors, you might get over your fear of a list of account numbers.

The entry screen is an 80-column display with the right forty columns devoted to a list of categories and Help messages. People with a 40-column display can toggle between the two sections. (Harvest recommends an 80-column card, two disk drives, and a condensed 132-column printer.) When you enter a category, typing a period generates a display of possible subcategories. You can split an entry among as many as ten different categories, with a running amount total displayed at the bottom of the screen.

The program's strong points include the Search/Edit routine and reports. Search/Edit does *not* require you to know exactly what you're looking for. You give the program the details you remember and it looks for a similar record. For example, if you enter the fifteenth as the day, the program searches from the eighth to the twenty-second. An amount of $100 causes a search from $80 to $120. If you don't know, leave the field blank. I have not found this outstanding feature in other packages. For reports, the *Pro* employs many different type styles and sizes to create impressive results. These reports make you look professional, which will surely help when you talk to lenders, potential landlords, and so forth. You're not likely to need a report not offered by the program (it offers about twenty), but if you do, you can add the expansion pack mentioned above.

The two hundred page manual contains a great deal of interesting information about farm financial management, but you may have trouble finding answers when you run into trouble operating the program. Despite the excellent Table of Contents, you need an index. In addition, the tutorial, reference, and financial management information is all mixed together. These make the manual easy to read but hard to use.

Bugs constitute the major problem with *Farm Ledger Pro*. I can't list all those I found, but a few examples follow. If you respond to the screen prompt "Return to Main Menu (Y or N)" with Y, you get an error 6 (file not found). The only exit is to re-boot. Sometimes following the screen prompt "Ctrl-D to Catalog Disk in Drive 2" comes "Insert Disk Containing in Slot 6 Drive 2 and Press Return." Disk containing what? You wanted a catalog to enter a file name. In other cases, following the same prompt hangs the computer. You can get going again—only to get DOS error 11 (syntax error). In this situation, because part of the protection prohibits an exit to BASIC, you must boot the system master, catalog your data disk, note the file name you need to type, re-boot the program, make menu selections to return to your starting point, then enter the file name. This error would be bad if it only occurred once. In fact, nearly every catalog situation on the Analysis disk fails, as well as some on each disk in the package. The problem existed in older Harvest programs incorporated into *Pro*, but they are worse now than before. An attempt to perform a profit analysis on data originally created with *Farm Ledger* resulted in system error 53. You cannot trust the prompt "Ctrl-E to Exit" either. Often the only exit is a re-boot.

I have more examples of poor programming, which, though not as difficult to work around as the bugs, are

nonetheless annoying. Even though the program has a configuration routine so that you can inform it if you have a two disk drive system, over half the time it needs that data the program displays "Insert Data Diskette in Drive 2 and Press Return." This saves very little time over a one drive system because you constantly have to monitor the display. In one case, it even prompts you to "Insert Program Diskette in Slot 6 Drive 6."

I have used several accounting programs more professionally done than *Farm Ledger Pro*, but all use account numbers and none possesses its Search/Edit ability. Most offer acceptable reports, but none as impressive as those from this program. Look at the problems mentioned and try to determine how they will affect you. I have met farmers who are quite happy with *Farm Ledger*, and although this program wouldn't be my first choice, it might be yours.

MIXIT-2

Agricultural Software Consultants
$595.00
48K with CP/M card

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

This menu-driven CP/M program develops least cost feed rations for livestock and poultry, plus least cost fertilizer mixes. Most similar programs handle only one class of stock, but *Mixit-2* copes with anything from fish to nonhuman primates. Consequently, it fits the needs of such varied users as aquarium owners, dairymen, farmers, feeders, feed mill owners, nutritionists, ranchers, stable owners, veterinarians, and zoo keepers. Its versatility extends even further: it allows you to use English or metric measurements. You can specify calculations for rations on an "as fed" or "100% dry" basis. You dictate rounding of numbers, not the program. You can define up to fifty-seven nutrients for each ingredient and specify the content of the nutrient in any unit. For example:

Protein....%
Energy....MCal/Kg
Vitamin A....IU/g
Zinc....PPM

You can enter conditions called constraints to control the program's cost cutting and insure ration quality. A computer can starve livestock if left to determine the lowest cost unhindered; certainly I have seen more abuse of such programs than any animal lover wants to see. *Mixit-2* allows you to ensure proper nutrition *if* you have enough nutritional training, carry out lab tests of ingredients to guarantee that they actually contain the nutrients published for them by the NRC, and make sure your entries are complete and accurate.

You can enter as much data on ingredients as a disk will hold, but no more than fifty ingredients for a given ration. When you enter nutrient data for items in the ingredient list, you need not reenter it for each ration. You also create nutrient lists (limited to fifty nutrients) which set out the nutritional requirements of the ration. Both lists may have constraints for any ingredient or nutrient, but the total number of constraints cannot exceed fifty. Proper use of these features ensures the profitability of your investment in this program.

When you want a ration computed, the program prompts you for an ingredient list number and a nutrient list number. The program considers every possible combination of ingredients, tests whether they provide the nutrients and satisfy the constraints that you specified, then asks if you want a list or printout of a one ton batch. You can specify a different batch size or run a routine that provides data for several different sizes. The program provides data on ration costs for each and computes the cost of your constraints. This allows you to determine whether the performance improvement justifies the cost of the constraint.

Mixit-2 has ample error traps. It advises you if your entries create conflicts. Of course, some errors lie beyond its detection. For example, the program has no way of knowing if the grain you plan to use contains molds or toxins. A note of warning: you may judge the program slow. It is not. Spreadsheet work to compare only two rations takes nearly as long as *Mixit-2* takes to develop a typical ration. A screen display shows you the program's progress so you needn't worry that it has hung.

Routines on the disk cover printouts for anything I could imagine needing, plus a printout that tells you everything about a ration on one 132-column page. Another routine allows you to tailor the program to your computer. Special programs, called *Beef and Dairy*, tailor the program for various categories of those classes of stock. A few CP/M utilities have been thrown in for good measure. Actually, this is the only commercial program I have seen that includes more features than advertised. You get a choice of a few extra cost options, too. Agricultural Software Consultants offers data disks for the more common classes of livestock, at a cost of $50 each. You will need to make some changes to fit your situation, but the time and typing saved makes these a real bargain. I recommend the *Beef and Dairy* disk because it has the greatest variety of ingredients. You can also get disks for swine, poultry, horses, or turkeys. Companion programs called *Price It* and *Stack* expand the basic program's capabilities.

The sheer amount of detail makes entering ingredient data drudgery, while setting up proper standards for maximum profit takes study and care. You must perform these things manually if you expect the program to solve real problems. Otherwise, the program is marvelously easy to use. You can easily change information you have entered at any time. Every menu allows you to return to the Main Menu or exit from the program. If the screen shows no menu, you can return to the last one by typing End.

Early versions of the program came with a substandard manual. Version 2.4 has an excellent loose-leaf manual, complete with index. The manual assumes that you already know the difference between protein and energy and how to boot a disk.

If you purchase one version you get the chance to update to the next for $50 or the amount of the price increase between the two versions. When the company fixes bugs, that is *not* a new version—all owners receive a free fix. Take note, major publishers. You can purchase a demonstration disk for only $30 and the program carries a money back guarantee.

Generally, I don't care for computer least cost ration programs. Still, of all the programs I've ever used for whatever purpose, I consider this the best. Flexible and inexpensive compared to its competitors. *Mixit-2* has enough options to be profitable if used properly.

THE REAPER

Reaper Software
$1,295.00
64K; II/IIe/III in emulation mode

Overall Rating	B	A	*Reliability*
Ease of Use	A	C-	*Error Handling*
Documentation	C	B	*Value for Money*

A total farm accounting program, *The Reaper* also gives you accurate cost of production records for up to seven field crops, provided by means of simple entries of your checks and deposits through General Ledger accounts. While the accounting portion of the program provides a complete set of double entry accounting reports, the management accounts serve as vehicles to distribute dollars to individual crops on the management side of the program. The program's basic design should interest anyone who grows field crops. It keeps excellent accounting records on up to ten additional enterprises, which might include such things as trucking, livestock, or a seed or feed sales sideline. Any farmer who generally doesn't use the computer every day will appreciate the ease of this menu-driven program.

The Reaper accommodates up to ninety-nine fields, ninety-nine crop storage units, twelve field inputs for soil tests, eighteen inputs for fertilizer and chemicals applied, and any number of fertilizer and chemical inputs (in the files) for application to various fields. The field history report tracks all these items as well as projected and actual yields for each year. You can also enter three lines of comments each year for each field. The program maintains crop inventory records as complete records on hedges, contracts, CCC loans, and grain placed in the government reserve program. *The Reaper* produces a total of twenty-seven different reports.

A special card supplied with the program provides copy protection. You can place the card in any available slot. This permits you to make all the backups you wish, but they only run on a computer with this card. The program requires two disk drives and supports three, or two drives and a Corvus hard disk. I would consider a printer essential as well.

The program resembles a farm tractor more than a sports car, because a farmer will feel very comfortable with it while a programmer will find many areas that could use more polish. Although I found no bugs in the program, a novice might feel rather shaken after making an error that drops him or her out of the program and back into BASIC. Such things as starting a report when the data files lack information can cause this. The manufacturer should add error traps to the program.

The price is nearly double that of some of the better farm accounting programs, but when you add the cost of a crop management program, the cost looks very reasonable, particularly since you have everything in one package. The program keeps the records you want, with only one set of data entry screens. In addition, you can enter tenant/landlord splits so that entries divide automatically. The program also allows you to split an expense among different enterprises. For example, you can charge 45% of each electric bill to swine, 25% to crops, and the balance to family living. The time this saves makes it easy to forgive any lack of polish and consider the program look well worth the price.

Everything about *The Reaper* is easy and consistent. The package includes sixty-nine different programs, but each operates in the same way. The four-program disks look intimidating, but the program is organized to minimize swapping. The ability of the average farmer to get both accounting and management data for three years on one disk helps, too. My main complaint about the operation of the program is the selection of a DOS enhancement that does not expedite loading and saving of text files. (I believe that Reaper Software is investigating this.) The program does have one feature which I hate: pre-entered decimals. I have become accus-

tomed to entering my own decimals and could not break the habit. Reaper Software insists that most users like this feature the best, so you will have to make up your own mind.

The documentation gets you started in fine style. Clear and easy to use, it has a good Table of Contents, index tabs, and an index. After you get going, however, you'll have questions for which the manual fails to provide answers. Most of the time, trial and error provides an answer quickly. When you get stuck, you'll find excellent telephone support. In addition, as Reaper improves the program, they offer updates at cost or less. When the third version came out, Reaper offered owners the four disks and all new (225 pages) documentation for only $25. A livestock module (under development) will give the program even broader appeal. Finally, they offer two different thirty-day trial plans.

I really enjoyed this program. I feel like I've found a jewel in the rough. I strongly advise anyone to check out *The Reaper* before buying an accounting program for their farm.

Tax Management

ESTATE TAX PLAN 2.0

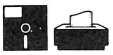
Aardvark/McGraw-Hill
$750.00
64K; Apple II/II+/IIe/IIc/III

Overall Rating	C	B+	*Reliability*
Ease of Use	C	D	*Error Handling*
Documentation	B	C-	*Value for Money*

In these economically uncertain times, any program that adequately addresses problems in personal financial planning deserves attention. *Estate Tax Plan* is such a program. Despite the complexity of estate tax law, this program appears comprehensive. It reflects current federal tax law as modified by the Economic Recovery Tax Act of 1981 (ERTA) and the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA). The program is designed for people fluent in the details of the legal and tax aspects of estate planning, helping you perform the lengthy calculations. It helps less qualified users examine various alternatives, but an expert should definitely review the alternatives.

Estate Tax Plan covers the many specific factors necessary for an estate tax analysis: marital and other allowable deductions, disposition of assets, death tax liabilities, bequests, and so on. One excellent feature permits you to examine four alternatives simultaneously, helping you make an intelligent choice for an estate plan.

I observed the following features while reviewing *Estate Tax Plan*, unexpected in a program of this price. The cursor wanders erratically around the screen. Editing completely erases all entries, either at once or while editing. This means retyping all entries to correct a simple misspelling (poor at any price). You cannot reset entries that should be blank back to blank after setting a numeric value, which happens when you forget to use the R(eplace) option. This affects the printout of the input data and presumably affects the analysis in some situations. If the Date of Analysis comes after the Date of Death of Client, you can correct the resulting error only by changing the Date of Analysis. Calculating Results requires additional information each time you use it, as does Printing Results. Lastly, every access to the data disk requests the drive number.



PROFESSIONAL TAX PLAN

Aardvark/McGraw-Hill
$395.00
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	A-	B+	*Reliability*
Ease of Use	A-	B+	*Error Handling*
Documentation	B+	B+	*Value for Money*

The *Professional Tax Plan (PTP)* is a tax planning tool designed for use by both individual taxpayers and professional tax preparers. As a planning tool, *PTP* will not prepare your tax return for you. Rather, it will help you in making the financial decisions necessary to reduce your present and future tax liability. It does this by providing you with two different planning modes: (1) a single situation for up to 5 years, and (2) a comparison of 5 different situations for one year. The program contains tax rate schedules and tables for tax years 1981 through 1984. For years after 1984, the program will use the 1984 rates, though these rates will be indexed if an entry is made in the "Cost of Living Adjustment" input screen (see below for a discussion of input screens).

In its latest version, *PTP* has been updated to reflect the provisions of the Tax Equity and Fiscal Responsibility Act of 1982. The program will handle virtually any tax input computation. Its only limitation is that it does not compute the limitation on regulated futures contracts if the Section 509 election is made.

PTP uses both a program disk and a data disk, so while it will work with one drive, the use of two drives greatly speeds up the program operation. The program is menu-driven, with entry instructions shown on each menu. There are 95 input screens, each one described in the manual. An Input Reference Guide listing each of the 95 inputs is included. These input screens cover

Filing Status, Exemptions, Income, Deductions, Credits, Payments, Indexing, etc. The program will automatically advance screen by screen as you complete data entry, or you may skip to any screen by entering "S" and the screen number. Pressing the "?/" key while in the data entry portion of the program will display a Help screen, providing you with information as to what to enter for a particular tax input. When data entry and calculations are complete, the program lets you print results for all, or selected situations or periods.

The manual is very comprehensive and contains two numerical examples that demonstrate virtually all of the program's capabilities. One problem is that some key items, such as information on which years' tax rate schedules are included in the program, are buried in the examples. These are stumbled across when they should be highlighted. Pictures of most of the menu screens are shown.

Both the program disk and the data disk are copyable by COPYA. However, it should be noted that program usuage is through a non-exclusive and non-transferable license granted by Aardvark. An annual maintenance policy for tax law changes and program enhancements is available.

In summary, *PTP* is a comprehensive, easy to use tax planning program that should assist both taxpayers and tax preparers in making the decisions necessary to reduce tax liabilities. However, no program, no matter how comprehensive, can ever fully replace a trusted and competent tax advisor. As long as there is an IRS, there will be a need for a CPA.

THE TAX ADVANTAGE

Arrays, Inc./Continental Software
$69.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	B	A	*Value for Money*

The Tax Advantage is a good general purpose tax preparation program. It supports Form 1040, schedules A, B, C, D, E, G and SE, and forms 4562 and 4797 (this latter form is not mentioned in the manual, but is part of the program).

The program is very easy to use. All functions are menu controlled, or are input with a few easily learned keystrokes; and in most cases won't have to be memorized since they also appear in a help menu at the bottom of the screen. When the program starts, you are asked to input some basic identification data (or review that data, if already entered).

Once you've entered all preliminary data the program proceeds to Form 1040; and when you come to a line that requires another form, you simply call it up. The same is true of the other schedules. If, for instance, you require a form for calculating the data, an option allows you to simply call up that form on screen as needed. You are not encumbered by memorizing the forms; the program prompts you with the necessary hints. (Of course, if you want a specific form, you must know what schedule it appears on.)

A very useful feature of *The Tax Advantage* is its ability to itemize any line on the form at any time. Simply move the cursor to a line and hit the "I" key. You can then add specific items into an itemization file, the sum of which is then entered onto the line in question. Itemization takes priority over any single entry that may already be on the line. An "inverse video"-I indicates that you have itemized a line, and will not allow you to make a single entry into the data file.

Several other good features include the ability to show tax calculations at any line in Form 1040. The 40-column Apple screen requires that many line items be abbreviated. Since these abbreviations are difficult to remember, type "D" on any line and a full description of the item will appear on the screen. Full editing capabilities are available for data entry and modification.

The Tax Advantage will also automatically read and use information from *The Home Accountant* files, freeing users of that program from the task of re-entering financial data.

The program is also capable of temporarily overriding figures entered onto the Form 1040. Ctrl-X allows you to override several lines, including those already itemized. An "O" will temporarily override a single entry. These options let you easily calculate the year-end tax figures of one or more tax strategies.

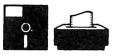
Another convenient feature is the printing capability. *The Tax Advantage* enables you to print out your data, facilitating information entry onto Form 1040. It will also print out schedule forms which can, in turn, be attached to Form 1040 and submitted as backup copies.

If you submit your own tax returns, it is recommended that you double check your figures and calculations; and the program can be extremely valuable when used in conjunction with your personal tax accountant. *The Tax Advantage*, finally, is also an effective tax planner for projecting income into the rest of the fiscal year.

All updates and customer support services will be provided to you for one year upon registration of your program at a $10.00 extended warranty fee. Also, next year's version of *The Tax Advantage* will be offered to registered owners at a reduced price.

The Tax Advantage will meet the needs of most

users, and will definitely facilitate the seemingly insurmountable task of filling in your tax forms by the April 15th deadline.



TAX BREAK PLANNER, TAX BREAK ANNUAL, and TAX BREAK FEDERAL FORMS

ProForma Software
$180.00, $130.00 and $75.00
48K: II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A-	A	*Value for Money*

Tax planning programs, *Tax Break Planner* and *Tax Break Annual* compute the minimum tax due. As the names imply, the latter calculates taxes for just one year and the former, for several years, using indexing. Although neither substitutes for a tax preparation program, in combination with *Tax Break Federal Forms* they become tools to prepare the actual return and to carry out tax planning as well.

After starting a new taxpayer file in response to the menu prompt, you can choose to enter information in the *Federal Forms* program. This companion program is a real joy. It requires some disk swapping, but not much. It automatically handles such difficult computations as Alternative Minimum Tax, Capital Gains, Installment Sales, Rental Income, and Depreciation. The program prints the final schedules in a format acceptable for submission to the IRS. You can even print multiple forms. The program includes twenty schedules, with supporting statements for many of them. After completing the schedules, you can switch back to either *Planner* or *Annual*; the program automatically transfers all the information from the schedules. You can then add the remaining information and have the program compute the lowest possible tax, which you can then transfer back to the *Forms* program to print the 1040. The *Planner* and *Annual* also feature a Return Overview report that shows the highlights of each return so that you can quickly compare "what if" projections, plus an Audit Risk Score that computes how likely it is that your return will be audited.

Tax Planner also functions purely as a planning tool, changing years and assumptions to estimate accurately your future taxes. In addition to indexing, which you can change manually, the program computes increases in Social Security taxes. You can view this information on the screen or print it out. I thought this program well worth the higher price.

All three programs are menu-driven, with ample error trapping and simple data entry. The system crashed only once, when I had the wrong disk in the drive. The adequate manual assumes neither computer nor accounting knowledge. The disks are copy-protected, but you can get backups for the modest sum of $5. (Why not raise the price by $5 and include the backup in the package?) Customer support is excellent, with a toll-free number shown onscreen and listed in the manual. Yearly updates cost $50—a bargain.

I checked the accuracy of the program's computations by running a complicated 1983 tax return through it. It worked perfectly, even catching some minor errors. All three programs are powerful, easy to use, and reasonably priced.

TAXMODE

Sawhney Software
$295.00
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A-	*Value for Money*

This easily used, menu-driven program helps you prepare your Federal income tax return and assists your tax planning. *TaxMode* quickly computes, saves, and prints the data needed for Form 1040 and Schedules A, D, E, G, SE, and W; it takes less than thirty minutes once you enter your income, deductions, and other raw data. You can save up to one hundred different cases on each data disk. The basic tax case allows you to enter ninety-four line items. Luckily, data entry is fast and easy. You can page each frame forward or backward, and advance or backspace each line item, which makes correcting or editing a snap.

A scratch pad calculator function lets you add, subtract, multiply, or divide multiples of numbers you want to itemize and include in any line item. For example, suppose you have bills from ten different doctors and want to enter the sum on Schedule A. With the scratch pad calculator, you can itemize and add these bills on the screen, then transfer the total to the line item or restart the calculator with the touch of a single key.

Once you have entered all your data, the split screen allows you to view about ten lines of data on the left and a summary of your adjusted gross income, deductions and exemptions, taxable income, and Federal income tax on the right. You have the option of auto-

matically calculating these summary computations after entering your data, or waiting and updating at different points during data entry. I found this an excellent feature because I like to see the immediate effects on my entries on a certain line item, such as medical expenses. At the bottom of the screen the program fully explains each line input item and reminds you whether you can enter a negative number or not.

Once you have determined your tax liability, you can display, print, or save the supporting details. The program also displays or prints your income averaging over three and ten year periods, your present tax bracket, all tax credits, and an itemized list of disallowed deductions. *TaxMode* will even tell you how much additional income you can realize before moving up to the next tax bracket—essential for tax planning. In fact, the program's real benefit resides in its tax planning capabilities, which means that you can use it year-round instead of just around tax time. Once you have entered the basic data, you can switch modes and change any line item to determine the resulting tax liability (without changing your basic case). For example, you can view the new tax effect of setting up two individual retirement accounts (IRAs) for you and your spouse without affecting your current tax case. The alternate mode also allows you to determine your tax strategy on large purchases (such as real estate) that you wish to use as a tax shelter in the current year, or analyze changes in future years. This excellent feature, which gives you the ability to quickly analyze the effects of certain investments, constitutes the real difference between this tax program and others.

At almost any time throughout the session, you can display or print your results for your basic case, the alternate mode calculations, the 1040 Form and general schedules, married couple deduction form, all supporting detail data, or a summary of input data on Federal tax liability. *TaxMode* prints neat, single spaced lines (with my Panasonic parallel 80-column printer) without modification with my printer card in slot 1. If your card occupies any other slot, you must indicate this fact before printing.

Another fine feature is that you don't have to swap disks if you use two disk drives. Once you boot *TaxMode*, the entire program is loaded (unlike other programs where you must constantly swap disks when preparing different schedules).

TaxMode is easy to run and usable by almost any age group with knowledge of Federal income tax laws. The documentation is thorough, clear, and easily understood. It includes a thirty-one page tutorial on the basic case and the alternate modes. The tutorial took me less than twenty-five minutes to run the first time through. The documentation also contains an explanation of all error messages and what to do if you get one, plus a handy reference tab that lists all ninety-four line items and a short explanation of each key function.

The one drawback is the copy protection. Sawhney Software states that it will replace damaged disks for a small fee, but the manual doesn't tell you how much. The manual does state that the company provides updates for future tax changes at a seventy percent discount from the current suggested retail price if the tax laws change substantially.

TaxMode is a well designed program for the individual or professional tax planner and preparer. I recommend it highly. I have only one suggestion: to add a line display at the bottom of the screen referencing the section(s) of the I.R.S. Code for each line input item.

TAX PREPARER

Howard Software Services
$250.00
64K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B-	B-	*Value for Money*

The Tax Preparer program is very useful for record keeping throughout the year and investigation of alternate tax strategies. Just about any schedule or form that you may need is represented in the package (schedules A, B, C, D, E, F, G, R&RP, SE, TC and forms 1040, 2210, 2106, 3468, 4562, 4726, 4797, and 5695).

It is important to note that this is a record-keeping program and not a program which will tell you what to do to optimize your tax position. You must make the decisions on what to enter on to the forms and what is legal and not. This is important to remember when using any program of this type. Another important point to keep in mind is that there is no guarantee put forth by the software vendor regarding the accuracy of computations in the program. The IRS insists on holding you responsible for the accuracy of what you turn in to them. This is not to imply that the *Tax Preparer* makes errors. It is only an advisory that you will be held responsible for inaccurate input results.

All of the software worked as advertised and updates for each form were posted to the 1040 as required. It is possible to make errors if certain forms are used before others, but these cases are spelled out in the instructions. Records are kept by code name so that several files can be placed on a data disk either to record different strategies or to accomodate several clients

should the program be used for commercial tax preparation. This is very convenient.

Output can be either to the screen or to a line printer. If line printer output is used, the form may be sent directly to the IRS as part of your tax return (except form 1040). In the case of the 1040 requirements, there are provisions for formatted output onto a standard form 1040.

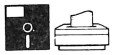
Another useful feature is the ability to create itemized lists for various entries. The system lists up to 1,000 entries, each of which will be summarized by the program and totals entered onto the appropriate forms. The lists may be printed as supporting data for the IRS.

Data entry is relatively convenient and editing data entries is quite convenient. This helps when studying alternatives.

Program documentation is marginal. The instructions will allow you to run the programs properly but that is about all. Only a few forms are provided in the appendix. A sample return is included with the program disk, which is helpful in learning how to use the program. Error trapping is relatively good in handling user problems. Nonetheless, it is possible to bomb the program by doing really offbeat things.

Because tax laws change yearly, Howard Software offers a nice update package. Each year in January, an update will be produced and be available to all users "...at a fraction of the cost of your original disk." In addition, packages which include more forms are in preparation along with certain state returns.

This is a very useful and well-designed package, with nice functional features.



TAX-MANAGER

Micro Lab
$180.00
48K; II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	D	C	*Value for Money*

The *Tax-Manager* is a tax preparation program that collects information for and prints out nine forms (1040, 2106, 4726, 4625, 6251, 2210, 2441, 3468, and 5695) and seven schedules (A,B,C,D,E,G, and SE). Unfortunately, as a tax preparer, all the program does is ask you to fill out the forms. The only calculations performed are the same you could do with the print form and a four-function calculator. No feature allows you to use the program to collect information and then report the results of that collection. This limits the usefulness of the program if you all have to prepare is one tax form.

Of course, once entries are made and stored to disk, you may then go back and change one or more to see what the effect is on your final tax. For tax planning, the program becomes more useful although you still must know where, and on what form, to make the entries.

The program does have an interesting sub-program that allows you to search a file by keyword to find tax tips. You may, for example, search for all entries having to do with veteran's benefits, and the program will present tips for you to consider when tax planning. You can find most of the tips by careful reading of IRS Publication 17, which explains all of the common forms and the allowable entries, but having a keyword index can be a help since the government documents are not always conveniently organized.

The program performs well and is easy to use. If you do not have Applesoft in ROM, you will have to boot the DOS Master disk first in order to load Applesoft into your memory expansion card.

Another sub-program helps you find required forms. The program asks a series of questions and then uses your answers to determine the most likely set of forms you will need.

The manual is laconic, at best. It gives the most basic information with no screen displays or other graphics to guide the beginner. The manual pages are lost amidst the space available in the 7″ x 9″ three-ring binder provided for them.

Two copies of the master disk are provided, and Micro Lab has a reasonable replacement policy ($10 and 30-days); or, if you prefer, you may purchase an extended warranty for $30/year. With the warranty, you receive free replacement for damaged disks and all updates as issued.

The best features of this program, finally, are the sub-programs to help you find deductions and to determine the proper set of tax forms for you. The tax preparation portion of the program does its job, but is not outstanding.

General

CODEWRITER

Dynatech Microsoftware, Inc.
$120.00
64K; Apple II+/IIe/IIc; 80-column card

Overall Rating	B	B	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	B+	B+	*Value for Money*

This series of programs allows you to express your ideas in plain English and then convert them into a working program exactly suited to your specifications. The package comes with a tutorial and reference manual, one data entry program generation disk, and one report generation disk.

CodeWriter requires no programming knowledge. It moves you through the creation of your program with self-prompting menus. You begin by designing your data entry screen (Blank Form) and deciding what type of information you will use to fill in the blanks (numbers, letters, etc). From here on, it asks you what to do if someone tries to enter numbers where you have decided only letters should be, and so forth. Finally, it asks you what blanks to fill in with figures computed from other blanks (filled in with numbers). You may even design your own display menus to assist other users of the program.

In the next step, you define how you want to send the information to the printer. As in the data entry design system, display prompts and Help screens assist you. When you've finished, *CodeWriter* goes to work generating your program code. It then saves your code to a blank disk.

Like all software, *CodeWriter* has its good and bad points. The manual constitutes the package's greatest weakness. It refers to commands used by a Brand X computer that just won't work on the Apple IIe. The publisher does offer several User's Notes on the disk that take care of misunderstandings, but it's still awkward to remember that an instruction doesn't apply to your system. You also face limitations on the programs that you create. For example, you can retrieve completed forms only by the information in a single entry on the form; you cannot use numbers larger than nine digits. For this reason, you should have the program demonstrated before you purchase it.

CodeWriter performs the tasks that its publisher claims for it and does so in a competent and friendly manner. If you have a difficult application to carry out or want to develop programs for clients, you'll certainly want to consider adding this program to your software library.

COMPUQUOTE

Peripheral Visions
$169.00
64K; II/II+/IIe/IIc; light pen

Overall Rating	C	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	B	C-	*Value for Money*

Compuquote, a cost estimation program, makes use of a light pen (not included) to produce and print quotes. It suits most forms of retailing because it allows you to record both materials and labor. Preparing a quote is as simple as selecting items from the price list (with the light pen), entering the quantity via the keyboard, and saving the result to disk or printing it out.

The program lives up to most of its advertising claims, but it has some minor drawbacks and a limited market. On the plus side, the light pen makes this system extremely easy to use by anyone, regardless of computer experience. You enter your own lists for products and services (multi-leveled if you wish). When you actually enter a quote, you may increase or decrease the prices on file by a percentage to reflect a discount rate or price increase. You can print quotes, save them to disk, or merge them with other quotes. On the negative side, new users may have some problems. When you enter your company name for the header printed on all quotes, you don't get prompts for how many characters you can enter. After you enter the name, the screen clears and you enter the street

address. The screen clears again and you enter more information. I'd prefer seeing exactly what I've entered and have the chance to change it. In addition, if you enter a comma while entering the date, you get an error message. The program really needs better screen prompting and error checking. When you print out a quote, the program makes no provision for the name you quote to, so the screen goes blank. I'd like the reassurance of a message as simple as "Printing. Please wait."

A number of utility programs allow you to calibrate the light pen, change the printer slot, change the business name, and so on. You run these programs by getting the Applesoft prompt and typing "RUN" and the program name. Being able to do this from within the menu would make the program easier to use. The program disk contains Diversi DOS, which means speedier disk access because it's faster than the standard Apple DOS.

The manual, a spiral-bound plastic binder of dot matrix printer output, contains a table of contents, appendices, and screen photos. A step-by-step tutorial guides you through the program. The manual also gives a clear description of the program's features. The disk is not protected, which means that you can make backup copies.

A nice additional feature would be the capability to produce invoices. This would make the package much more valuable to retailers. Otherwise, I found that *Compuquote* produces quotes easily despite some minor inconveniences. It's attractively packaged, logically thought out, and the use of a light pen is a definite plus. However, in the final analysis, I feel that it has limited use and costs too much.

DESK CALCULATOR II

Telephone Software Connection
$30.00, via modem; $35.00, mail order
48K; Apple II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	A	*Value for Money*

Desk Calculator II is the most comprehensive calculator program available. It literally turns your Apple into a pocket calculator that has functions ranging from trigonometry and statistics to metric-decimal and hexadecimal-decimal conversions.

The display is a graphics representation of a large pocket calculator. The left hand side is the main calculator with alphanumerical display at the top. The right hand side shows ten memories and twelve keys that can be redefined by the right arrow key.

These keys include statistics, both one and two dimensional arays, factorials, permutations and combinations; rectangular to polar conversions; degrees to radians; trigonometric, hyperbolic and logarithmic functions. There is also a comprehensive series of metric-English conversions, and for computer programmers, decimal to hexadecimal conversions, and the display of the Hi and Lo bytes of the address. The program allows user-defined functions, and during normal calculations allows the use of parentheses for evaluating simple expansions like 6*(3+4) =. If a printout of the calculations is needed, the printer can be toggled from within the program.

The program is completely self-documented. It has an excellent error checking routine that will indicate an error in the display for impossible calculations.

DESK CALENDAR II

Telephone Software Connection
$35.00, via modem; $45.00, via mail order
48K; Apple II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	B	*Value for Money*

Desk Calendar II is an electric memo book that can store daily appointments, memos, reminders, or a diary of the day's activities. It interfaces with all standard clock cards, using a board to display a running digital clock at the top of the screen. However, a clock card is not necessary to use this program.

The program generates a working disk with initialized data files, including a one-year calendar starting from the month of your choice. This operation takes eight minutes. It incorporates all major holidays in its monthly files. Then you can enter an appointment schedule, or reminder messages for any date of that year. Reminder messages can be flagged so that they appear every day for a full week before the event or only for that day. There is also a feature that allows you to enter a memo for every Tuesday of the year or for every third Thursday, and so on. Entries can be later edited for any particular day. A search function finds any keyword included in data for a range of months, allowing you to locate a particular appointment under someone's name.

Upon entering the program, either you or your clock tells the program what day it is. You can either look at your daily schedule on screen or send it to the printer.

You can also ask to see another day. You can see all of the reminders for a particular set of dates. The program found all of the holidays but for some reason could not locate my own reminders; however, they did show up for the day requested. The program also features a perpetual calendar. Apparently, there is no range limit because B.C. dates also work, and there were only ten months in a year back then in the dark ages. Finally, there is an option for printing all the appointments and memos for an entire year.

The program is useful if you have a busy appointment schedule and no secretary to keep track of things. Since you wouldn't access it more than once or twice a day, it could be a fairly unobtrusive and (if used discretely) private source of scheduling information.

QUALITY ALERT

Penton Software, Inc. (PSI)
$795.00
64K; Apple II/II+/IIe

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	D	*Value for Money*

A statistical quality control software system, *Quality Alert* analyzes both variable and attribute data obtained from samples of a manufactured product. It assumes an understanding of statistics applied to quality control data.

I disliked many things about this program, which I'll cover first. *Quality Alert* costs almost $800, is copy-protected with an unusual version of DOS, and has no backup system disk. You must pay an additional $20 to buy a backup. Copy protection is frustrating enough to a business user, but paying $20 for a backup disk for an $800 software package is unacceptable. Penton's license agreement adds insult to injury. You do not own the program—you have bought a "nonexclusive license" to use it while it remains the property of the publisher. You can't copy the manual, either. The program is licensed "as is" and "The entire risk as to the results and performance of the program is assumed by you. Should the program prove defective, you (and not PSI) assume the entire cost of all necessary servicing, repair, or correction." Isn't that nice.

It goes on. The same manual comes with both the Apple and IBM versions of the program, which proves distracting at best when comments apply to one computer alone. On occasion, it gets much worse. For example, the manual states: "It should be noted that some numeric discrepancies will exit in the illustrated output in the tutorials between the Apple and the IBM computers due to the differences in the number of significant digits carried in the intermediate and final calculations."

I would have preferred non-copy-protected disks, or an accompanying backup, or even a free backup upon return of the licensing agreement. Certainly the manual should come as an Apple version or an IBM version with the correct numbers in the examples.

Despite the shortcomings listed above, *Quality Alert* is an intriguing program. Virtually every step of its operation takes place as you select items from menus, answering very precise questions, typically with yes or no answers. The manual consists primarily of clear, easily followed tutorials on each feature of the program. The program itself is easy-to-follow and you can begin using it within a very short time. It produces numerous high-resolution plots and graphs, but to take full advantage of these features, you need a graphics printer. The package includes an extensive and excellent set of printer drivers from Southwestern Data System's *Printographer* program. *Quality Alert* prints graphs using the full width of your printer. The manual illustrates every graph type. The program also excels at computational speed, mathematical accuracy, and error handling.

Quality Alert is a specialty product. The publisher could provide a less frustrating product with minor changes. Of course, the price is high, but it has few competitors. It's accurate, fast, easy to learn, and produces effective output. If you need a statistical quality control package, it might just be your solution.

VERSAFORM

Applied Software Technology
$69.00; $389.00 for hard disk systems
48K; Apple II/II+/IIe/IIc; 16K language card

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

With *VersaForm* you can design your own business forms, enter information on them, print them out on blank paper or preprinted forms, and then create custom reports using your data. The form you design on the screen resembles the paper forms you have been using. The printed reports and forms can then use some or all of the information on your original screen and format it any way you like. The data on the reports can be sorted according to any specifications you desire. For instance, you can produce a report of all your

customers in Illinois who owe more than $500 and then print out bills for them.

The documentation is among the best I have seen. The slipcase contains a special tutorial manual and disk which takes you step-by-step through entering information on a form and printing out a report. A spiral-bound manual has chapters on designing forms, setting up automatic checking and filing, entering data, searching for forms, using the calculator, sorting the information into reports, copying forms, and formatting information for preprinted forms and mailing labels. The manual appendices contain information on formatting and copying disks, error messages, and configuring the system to your hardware. There is a complete index and a table of contents, as well as a separate summary booklet for reference.

The forms are very easy to design, thanks to excellent onscreen help. The system prompts you when action is needed and usually explains what it is doing. After only a short while, you can do without the manual. When you design the form, you can ask for automatic error checking on individual entries. After you define the type of information the system should accept, *VersaForm* can check the entries as you make them. For instance, you can specify that an entry calling for an account number has eight digits. If you later key in six digits and a letter, the system will not accept your entry. You can also specify automatic lookup. When you enter one item, such as a part number, the system will look up and fill in the part description, the price, or whatever other information you desire. The system can also automatically insert the date which you first entered when you booted the program. Although it sounds difficult to design such a sophisticated form, it is made easy by the system's step-by-step, onscreen guidance.

You can instruct the program to perform calculations automatically. For example, if you enter a unit price and a number of units, you can tell the system to multiply the two and figure the tax. You can tell it to add columns and rows or perform any other mathematical function. You can specify left, right, or decimal place justification. The system will round off numbers if you desire. It also permits you to perform mathematical calculations on screen as you enter data on a built-in calculator. The form you design includes an unlimited number of fields, but each of them no more than twenty characters long. You can also have columns of data on the form.

After you have designed your basic form and entered information on it, you can design report formats to sort, analyze, and print out this data, then save them on disk. You can also send out data to Pascal-based word processing programs to create form letters. The manufacturer mentions *MTF Pascal Word Processor* as a compatible program.

If you need to print out your information on an existing preprinted form, *VersaForm* will let you lay out your data to match the form. The module for doing this is easy and powerful. Mailing labels can be prepared with this function, though they print only one label across.

The system requires two disk drives and supports an 80-column board and a one-wire shift key modification. Control-A will enable you to use the shift key. The manual does not mention this, but the people at Applied Software told me when I called. All the disks (six of them) are copyable except one, and the publishers will send you a backup of that one free. A replacement costs $14.95. These are very generous terms and further illustrate the high quality of this package.

The system has some limitations. Although a single form can have more than one page, each field is limited to twenty characters. More importantly, you can only search for records using one field, called the index key. This can be any field you designate, but it means that if you designate account number, for example, to be your index key, then you cannot search through your records by name. When producing reports, you can select reports that match any specification, so it is possible to select only those records which match a particular name. They will not appear in their original format, however, but in the report format which you have designed.

I found no bugs in my copy, and thoroughly enjoyed learning and using the program. It ideally suits almost any business and has many uses even in the home.

EDUCATION

Education

Introduction

Whether you enthusiastically embrace the idea of computers in schools or dread the thought, you need to keep a few things in mind if you find yourself in the position of buying educational software for school or home use. First, parents and educators must not abandon their professional training and common sense about planning a curriculum or evaluating software for its educational design. Software should complement a child's formal instruction, not replace it. Second, educational software for preschool and elementary school children should differ from educational software for adolescents and adults. Children think qualitatively differently than do adults. They may also lack the fine motor skills needed for some programs, or the typing skills needed for others. They think more concretely and may not handle abstractions well. For this reason, programs for young children should rely more on graphics than on text, and color is very important. Third, educational software, because of its nature, demands clear and unambiguous directions and good error handling. Flaws in these areas can actively interfere with a program's effectiveness as a teaching tool. Fourth, a program should follow the logic of its subject. For example, math programs should allow you to enter answers from right to left rather than left to right, because that's the way that you solve them. Furthermore, a program that limits the time you have to answer a question should allow you to modify the timing to accommodate different age and skill levels.

We've divided Apple educational software into three general categories: Computer Aided Instruction (CAI), Computer Managed Instruction (CMI), and Computer Science. Most people think of CAI when thinking about educational software. It includes drills, tutorials, simulations, and problem solving programs, covering such topics as math, science, foreign languages, and reading skills. Simulations help students learn about the "real world," while tutorials may introduce new material, provide individualized instruction for different skill levels, or help students catch up with the rest of the class. Most promising are the problem solving programs, which encourage students to develop logical thinking, powers of observation, and what psychologist Jean Piaget called "formal operational thought." Few of these programs as yet exist.

Computer Managed Instruction means software designed to help educators perform their jobs more efficiently, plus "personal productivity software" such as word processing, database management, and electronic spreadsheet programs. With them you can create tests, keep records of test scores and attendance, track inventory, schedule, maintain a mailing list, record budget information, and design puzzles. In other words, the computer can help educators carry out the most basic tasks in the classroom to the most complicated attendance projections. CMI software, when properly applied, can save hundreds of hours now spent on paperwork.

Computer science includes programming skills and computer operations. Members of the Apple II family of microcomputers come with the BASIC language built into the machine. Other languages, such as Logo, PILOT, Pascal, and FORTH must be loaded into the machine from a disk. Advocates of Logo claim that it puts children in charge of their own computer-based learning. PILOT helps you create CAI lessons. However, computer science consists of more than just learning computer languages. It also entails an understanding of the electronic operations of computers, robotics, and operating systems. A number of CAI programs help you learn such concepts, and you can even buy computer kits to assemble to grasp the inner workings of microcomputers.

Now comes the hard part. How do you choose which software to purchase given a limited budget? You must determine your priorities and then look for the software that gives you the most for the money. For CMI, which type of program best meets your needs—an individual program

(such as a database) or an integrated system? What tasks currently performed by people would best transfer to the computer? For CAI, which programs best complement the current or planned curriculum? Do you want the programs to review material, introduce new concepts, or allow for individualized instruction? Make a list of the questions most important to you and then take a close look at the reviews in this section. If you can, try to test in the store any program you're considering buying before you take it home.

If you are willing to invest the time needed to determine your own priorities and to thoroughly investigate the software available, then you will no doubt discover how much computers can contribute to education at home or in school.

—Stephen Taffee and Andrew Keogh

Computer Aided Instruction

General

LEARNING POTPOURRI

Ventura
$39.95
48K; II+/IIe/IIc

Overall Rating	C+	B	*Reliability*
Ease of Use	C	D	*Error Handling*
Documentation	C	C-	*Value for Money*

Grades: 2-6

Learning Potpourri is a set of four unrelated programs that fit under the broad category "educational." The four programs are Word Match, a Concentration-like game for two players, Mouse Math, a very elementary and slow math practice game, State Capitals, a quiz game about what the title suggests, and Drawing Pad, a low resolution drawing program. Only one of the four games is at all exciting, and it is the only one that reinforces the few things it tries to teach.

Word Match is by far the best of the four programs. This game for two players uses the high resolution screen to present a grid of 4 by 4 spaces in which words are hidden. The players choose two spaces during their turn, trying to find matching words. Matches depend on the type of lesson (synonyms, antonyms, homonyms, etc.). The words in the selected spaces are revealed, but if they do not match, they are hidden again and the student must remember where they are as other words are revealed during subsequent turns. The game has just the right balance of difficulty and challenge to ensure continued play and provide a true learning tool.

Mouse Math, on the other hand, is a very poor program for learning anything. It uses the low resolution graphics screen for elementary math practice, but draws numbers and text extremely slowly. If the student answers incorrectly, the message "higher" or "lower" is given. No number of wrong answers to a single problem will ever invoke the correct answer. The sound is always on. The combination of extremely slow graphics and ever present sound makes Mouse Math very tiresome after a short time, and diminishes any educational value greatly.

State Capitals has good graphics going for it, but fails to some extent in the way questions and answers are presented. This program tests for knowledge of state capitals by using a somewhat awkward lead-in to the actual question, and then presents the question with a multiple choice answer that only requires typing one letter. This seems a very poor way to reinforce the retention of the actual state capital name. Again, the sound is always on, although it is not as obnoxious as in Mouse Math.

Drawing Pad can only loosely be called educational. It is simply another program that allows the user to draw on the low-resolution graphics screen. Colors can be changed and three pictures can be saved. The only feature of the program that is at all out of the ordinary is a Replay mode where the entire picture is recreated by redrawing all the previous plotting steps at high speed. In Drawing Pad, thank goodness, the sound can be turned off.

Venture has not gone to a great deal of trouble in producing the four programs in *Learning Potpourri*. Error trapping is at a minimum, which precludes the use of this software in most classrooms. The levels of the different programs are so mixed, with Mouse Math being very simple and Word Match being challenging, that it is unclear where the programs could be used. There are many other better educational programs on the market that do many of the same things that *Learning Potpourri* does.

NUTRITION SERIES
Food for Thought
You Are What You Eat
Food Group Puzzles

Marshware
$39.95 (each)
48K; II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	C-	*Value for Money*

Grades: 3 and up

Three programs comprise Marshware's *Nutrition Series*. The first, Food for Thought, is a tutorial disk which gives you knowledge of the nutritional content and value of each of the five basic food groups and their role in establishing good eating habits. The second, You Are What You Eat, analyzes your daily food intake in terms of the number of recommended

daily servings of the five food groups. The third, Food Group Puzzles, is a game program in which players become aware of the variety and flexibility of food groupings and good eating habits.

In Food for Thought, each of the food groups is presented in a different module. You can study the modules in any order. Information on the importance of each group in maintaining bodily health is given, using both text and graphics. There is some interaction in the tutorials through filling in blanks. A twenty-question quiz is also included.

The teacher management system keeps track of ten students' scores and includes a coding system to identify children with the same first names. If you have a large class, however, you'll have to clear these records periodically.

This program is useful as part of an educational program, and offers enough interest to stand alone, unlike the other programs in the series. The graphics are only adequate, however; they are not sufficient for a complete understanding of the concepts.

The objective of You Are What You Eat is to develop awareness of good eating habits and an understanding of the relationship between good eating habits and good health. Students are asked to keep a diary of their food intake for one day. Only one day is analyzed at a time; there is no provision for a cumulative analysis. There is space for twenty-four different foods selected from thirteen categories. Food is listed by name (apple, popcorn, catsup, etc.); quantity or vitamin and mineral content is not taken into account. Once the list is complete, an analysis is made of the number of servings from each group and a comparison made to the recommended daily servings (again without respect as to the amount in each serving).

This program is limited to helping form an understanding of food groups in a very general way. It is in no way meant to help you with dieting or to do a nutritional analysis of daily food intake. It would be foolish to rely on this program alone to determine proper eating habits.

Food Group Puzzles contains two games. In Sorting Them All Out pictures teach the recognition of thirty common foods and help the student learn to place them in their proper group: meat/protein, fruit/vegetable, bread/cereal, milk/cheese, fat/sugar. In Putting Them All Together students create balanced meals by planning breakfast, lunch, dinner, and snacks, and placing the correct food groups in each meal category. The game then provides a summary and analysis of the menu. The analysis is not sophisticated, but simply looks at how many food group servings are contained in the meals. Winning depends on knowing the recommended daily servings of each of the five groups.

Both games are easy to play. That's a good thing because if you give a wrong answer in Sorting Them All Out, the game stops! Also, the concepts taught are not difficult enough to warrant playing the games more than a few times. Therefore, it would not be a worthwhile purchase for the home.

Marshware claims that all of these programs are suitable for ages seven to adult. That range is questionable; the reading vocabulary is more suited to children in grades three to eight. While these programs may work at the high school level, they are not challenging or sophisticated enough for adults.

AMERICAN HISTORY ADVENTURE

Queue Intellectual Software
$59.95
48K; II+/IIe/IIc

Overall Rating	B-	C-	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

Grades: 4 and up

If you've ever wanted to tour the wild plains of America, chatting with all the famous explorers, inventors, and statesmen, then come along on this educational odyssey. In this program, you instantly become a knowledgeable reporter who interviews many of the outstanding figures from the past.

The vendor of this quasi-text adventure calls this an educational game. I don't think this paints an accurate picture of the software, which to my mind more closely resembles a well-programmed learning series. First off, there are no graphics presented, allowing your imagination to roam free. The distance you travel, though, depends on how well you can answer questions and name names. With the depth of questions presented, it may take nearly two hours to visit all the leading figures of history. On the other hand, incorrect answers shorten your trip to a matter of only twenty minutes or so.

One of the nice features of this program is its ability to branch to different sections of history, even skipping some units entirely. The reason for this is that with your multiple-choice answers, a wrong response usually results in the display of a brief description of the famous figure, and the program continues from that point onward in history. In this way, many years can be bypassed (along with the chance for you to win extra points for correct answers).

Secondly, different levels of difficulty allow for either fifty or 100 points for each correct answer. If

you're in need of assistance, push "H" for Help. In real life, help of any type is rarely free, and in this game, you loose half the value of the question. The hitch is to try and use the Help option as little as possible, but enough to win. Don't think for a second that all hints are created equal—or even come close to what you expect. This is precisely what makes the whole thing so much fun.

The documentation says that you should, at times, answer incorrectly so that the well-researched explanatory material on a particular character can be displayed (an unusual procedure, don't you think?). I find it just as enjoyable, once I have gone through the program a few times, to play this way in order to skip as much time as possible to see just how fast I am able to complete the program. Added to that is the handy feature whereby you can quit at any time during the posing of a question and still be able to resume just where you left off the next time you start.

If you're interested in *American History Adventure* for classroom use, for an extra $13.00, you can send in your disks for updating with the Management System. This allegedly allows you to keep up with how your students are advancing, as well as letting you print student records. The classroom applications of this program are broad.

A serious problem I encountered during game play caused me a bit of concern. Just before I reached the point when it would normally be time to switch to the second disk, my computer beeped at me and displayed "Syntax Error." The only thing I could do was re-start the program from the beginning—losing close to an hour of work! Out of curiosity, I persisted in trying to get this message to flash again—thankfully without success. This is evidence, however, that Queue still needs to do a little work in the area of beta testing. The rest of the program works correctly—so well in fact, that I could not even cause it to drop out. Once, Queue fixes the bug, they'll be on their way to offering consumers a truly fine American History learning adventure.

COSMIC CARNIVAL

Walt Disney Productions
$59.95
64K; II/II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	B+	A-	*Error Handling*
Documentation	B	D	*Value for Money*

Grades: 5-8

Disney, the managers of some of the world's most popular amusement parks, seems like the appropriate people to teach carnival management. While many business simulations teach supply and demand, *Cosmic Carnival* takes it one step further by including the effects of energy consumption. In order to win, you must operate a carousel, a roller coaster, and a spinning airplane ride for one week so that they are both profitable and eighty percent energy efficient.

Before opening the carnival, you have to set ticket prices, determine ride length, decide on the number of ride seats, and fix opening and closing times for each ride. In addition, unpredictable occurrences such as stormy weather, competition from a circus in town, and an unexpected school holiday can raise havoc with your business plan. Entry is completely menu driven by either keyboard or joystick. You can raise or lower values with the joystick and the arrows allow for keyboard entry.

After a short animated view of the ride, you get the crowd's reaction; patrons line up either for tickets or refunds. At the end of the day a report, which you can print out, is issued for each ride. It includes kilowatt hours used, number of riders, energy efficiency, sales, operating costs, and profits. The best way to increase ticket sales is to give the riders a long ride at a cheap price. However, operating costs increase with the duration of the ride, operating hours, and number of seats. Somewhere there is a happy medium where the customers are satisfied and the park makes money. Naturally, the trick is to find this compromise and the best hours to operate the ride.

Cosmic Carnival uses an interesting concept to teach basic economics to young children. However, children won't play it on their own, even with the bait of getting to play a bonus game as a reward for success. While it is best suited for a classroom environment, I see a problem there as well: once a child figures out the solution he might tell the rest of the class. Consequently, the program probably has little repeat value.

I and my young testers managed to optimize one ride on the very first guess, but took three additional thirty minute games to increase the energy efficiency of the other two. Bad weather happening on one or more days gave us a lot of grief until we managed to operate with a minor loss using about half as many passenger seats. Fortunately, long games can be saved to a formatted disk for continuation later.

The bonus game, while cute, is very simplistic. The object is to pick up creatures worth points on an alien planet. Your starting fuel is based on your energy efficiency during the park simulation. You use fuel moving around and touching the flying aliens that guard the planet. Additional fuel can be obtained by picking up the energy crystals left behind by an asteroid.

In sum, *Cosmic Carnival*, while offering an interesting economic simulation for youngsters, will not hold interest beyond one good solution. The animation

sequences, which cannot be bypassed, slow the game down for older students who are impatient to try out their next solution. Last, but not least, $60 is way out of line for a program of limited use. Disney should consider lowering the price to, say, $30 or less to gain a wider audience.

ALCOHOL: AN EDUCATIONAL SIMULATION

Marsh Ware
$49.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 7 and up

This program teaches the effects of alcohol to people from elementary school age to adult. This is only a simulation; no actual drinking takes place. You and four friends are attending a party. You pick your drinks each hour, choosing from beer, wine, or scotch; and either sip or gulp it. You have the option of eating a pizza beforehand. Then, based on your body type and drinking pattern, the program predicts the blood/alcohol content and tells you how you're feeling and acting at the party. It also tracks your computerized friends. Finally, when you drive home, the program simulates the consequences, from a simple ticket to far worse.

I personally recommend this excellently formatted program because of its responsible treatment of an extremely important subject, aimed at a very impressionable age group. I advise you to take advantage of the opportunity.

LAW IN AMERICAN HISTORY

Queue Intellectual Software
$45.00
48K; II/II+/IIe

Overall Rating	A-	A-	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A-	A-	*Value for Money*

Grades: 7 and Up

Law in American History is an educational program designed to stimulate interest in historical events through simulations, exercises, and tutorials. The program, along with the textbook *Law in American History* (Scott Foresman and Company; 1983), was written by James G. Lengel. The seven interactive modules cover history from the 1600s to the present and contain a variety of approaches to instruction. Students are presented with actual facts of landmark cases through case study methods. They identify legal issues involved, relate them to the Constitution, examine precedents, and finally give an opinion.

The Case of Peter Goodman concerns religious freedom and social concepts of the Puritan Plymouth Colony in 1631. It examines the issue of working on Sunday, and stimulate students' reasoning skills.

To help students understand the role of British laws in American history, life in the pre-revolutionary era is studied in Intolerable Acts. The program helps students understand the role of British laws in American history. Particular attention is paid to the Stamp Act, Quartering Act, and the Townsend Act. The students must apply these laws to proposed situations, make decisions, and explain their reasoning concerning the situations.

The Bill of Rights program presents a series of actual cases situations from throughout American history. These give the student the opportunity to learn about personal rights as guaranteed by the Constitution. Students can access the Bill of Rights through the program's database and use what they find to resolve each of the twenty cases.

The ole West comes alive at the Vigilante Mock Trial. Students form two teams, defense and prosecution, to conduct the trial of horse thieves. Witnesses are interviewed. Prosecution or defense may go to the jury. The defendant can plead guilty. The computer judges the statements of all the witnesses and comes up with a verdict at the end of the trial. This program takes one to two hours to complete.

Case Study: Brown vs Board of Education provides additional studies of the Constitution with regard to segregation in 1954. Through case study method, the student identifies the legal issues, determines how they

relate to the Constitution, examines precedents, and gives an opinion. A database of relevant phrases and precedents is easily accessed.

Case Study: Tinker vs Des Moines involves student rights with regard to dress in 1969. The student studies freedom of speech and action in resolving the case. Again, access to the Bill of Rights database helps reinforce the learning process.

The seventh program is a 1974 case of sex discrimination. Sex Discrimination Mock Trial has two teams conduct interviews, question witnesses, and present their cases to the jury or settle with the plaintiff. The computer judges the students' statements and comes up with a verdict at the end of the trial.

Law in American History is written for junior high and older students. It helps students understand important events in America's past, lets them participate in the legal process, and encourages decision making. Most of the programs offer a printed transcript of the students' performance. This program is an interesting way to supplement any school curriculum.

Thorough documentation is provided by Queue. A toll-free number is provided for problems or questions and damaged disks are replaced for a $3 fee.

MEGAPAK

Logodox
$40.00
48K; II+/IIe/IIc

Overall Rating	F	C	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	C	F	*Value for Money*

Grades: 7 and up

On booting this program you're presented with some fairly clever manipulation of the screen leading to a menu of choices of educational programs. These include Presidents of the United States, States, U.S. Constitution, the Gettysburg Address, Colossal Thinkers, Wordcatch, Scientific Method, Mathemagical Ways, Applesoft and Machine Language Tutorial, a personal database, and an assortment of games.

Unfortunately, this collection is of little educational value. You're presented with a list of facts or instruction in each area, followed by a quiz. If you answer a question incorrectly, the program gives the correct answer immediately, without offering a second chance.

Most of the information taught is trivial or more easily learned from other sources. The games are too primitive to entertain sophisticated children. The System Manager on the disk includes a primitive editor and a DOS speedup. The latter is of similar or poorer quality as some available in the public domain.

I've seen free educational disks from local user groups with better programs than these.

TRUCKER; STREETS OF THE CITY

Compuware
$24.95
48K; II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B/D	B	*Error Handling*
Documentation	C	B-	*Value for Money*

Grades: 7-12

Compuware has packaged two widely divergent programs on the same disk. Neither comes with a warranty card or tells you where to phone if you have trouble with the programs. *Trucker*, a text simulation program, sets up practical math problems and encourages thoughtful risk-taking. You choose the variables for your trip and play the game to see how your choices affect the game's outcome. You're told how much gas you have, weather conditions, and your physical condition. You have the option of stopping at truck stops every once in awhile. You can either load your rig with the less risky, but unprofitable mail, freight, or high-risk, high-profit oranges (with the option of overloading) in Los Angeles. Then choose either a southern, middle, or northern route to New York City. Each route has a different length, density of police, number of weigh stations, and road conditions. You also know how much profit you must clear to keep up payments on your truck. If you try to keep the accelerator down, you'll lose money on extra gasoline even if the police don't nail you (no CBs in this game). If you drive *exactly* at the speed limit with *exactly* the legal load, you run a greater risk of spoilage or missing your deadline. It takes only about half an hour if you don't have an accident on the road.

As the Transportation Director of River City in *Streets of the City*, you face a complex and baffling task. You must make yearly budget projections and take part in risky labor negotiations, property tax proposals, and bond issue votes. You are judged on your record and on your promises to a voter coalition. Your budget must improve bus service and street conditions by wise allocation of monies for operations, maintenance, and construction. The program uses many six-digit figures in computations, so, unless

you're a genius you will probably want a calculator. Your performance is rated year by year, by the city fathers who decide whether or not to renew your contract. (I lasted four years and went through two labor strikes my first game.) The baffling part is that sometimes conditions (street conditions, safety, or bus service) will worsen in a given year even though you thought you had increased expenditures in that area.

There are so many variables affecting different areas that it seems that the documentation masks the arbitrariness of the game. For these reasons, it best suits an intermediate or higher math or social studies class in which the teacher can provide immediate assistance. Otherwise, the students may become frustrated too quickly. I also find it curious that Compuware would package two games of such divergent complexity on the same disk. Teachers at different levels will need to share the disk to get its full potential.

HAIL TO THE CHIEF

Creative Computing
$24.95
48K; II/II+/IIe/IIc

Overall Rating	B-	D	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	B	*Value for Money*

Grades: 9-12

This game simulates a presidential campaign and helps you study issue appeal, regional interests, campaign strategy, and (at a higher level) campaign finances. All play occurs according to a two-month calendar, with weekly popularity polls to measure the effectiveness of your strategy.

Variables give the game different levels of sophistication. There are ten levels of difficulty for each of the four campaign levels based on the presence or absence of political parties, a fixed or variable budget, or the issues. Once you have made these choices, you arrive at the heart of the game—the issues. These range from energy policy to strategic arms limits to Mid-East policy. But be careful. This program was created in 1976, and, as you know, political stands change from hour to hour. As the candidate, you choose between being extremely liberal (-99) to extremely conservative (+99). You then get your opponent's quantified stand (usually middle of the road, which means that you begin behind your opponent in the polls). Higher levels of difficulty introduce the possibility of a presidential debate and news conferences. You should refer to the documentation or use the "100" command for samples of liberal and conservative stands before you make your choices. In some cases you will discover that the issue area differs from the current definitions.

Obviously, choosing a stand involves knowing the liberal and conservative positions and how different regions of the country respond to them. In some of the historically controversial issues like the Mid-East, women's rights, nuclear policy, or deficit spending, you may find yourself at a political disadvantage. To check your positions against voter reception, I recommend an early poll of each region even though such a poll is costly. You can change your stands in the middle of your strategy if you don't mind being insulted by the program ("Waffler!"), but I'm not sure the program has the sophistication necessary to adjust your popularity according to your changes.

The campaign takes place during the last two months of the election. Each day you choose from five strategies: national television address, regional ad campaign, travel, a position paper, or a national poll of regional issue reception. For all but the last, you specify which issues you intend to stress. For the regional option, you choose which region you will focus on. Each week a popularity poll broken down into regions indicates the success of your campaign strategy. The program also offers a short critical review of your television performance, again stressing the issues. Appropriately, a negative review says "An actor would have done better." The program also tells you how much money the strategy cost and how much you have left, warning you when you run low. On election day you get a breakdown of the electoral vote, which only roughly approximates the most recent weekly poll.

Of course, such a simulation has some rather obvious limitations. If not updated regularly, it won't reflect the current public opinion. (Though this very fact might make it useful as a history lesson.) It also tends to emphasize practicality over convictions or far-sighted policy decisions. The regional options let you emphasize different opinions in different regions to maximize your votes, and completely ignore the impact of national television coverage.

The documentation or screen help is adequate. At any point you can type "Help" to receive instructions. I would like to see save and print features, also. However, my disk had one fault that spoiled play at higher levels. Whenever I appealed to labor for funds, the disk rebooted. There is no warranty card or number to call if you have a problem.

Given the inherent limitations and the frustration encountered with my particular disk, I found this a well-constructed and documented simulation for players from junior high through adult.

HOW A BILL BECOMES A LAW

Intellectual Software
$59.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	A	C+	*Value for Money*

Grades: 9-12

As a representative from the state of Adams, you are called upon to guide a bill through Congress which, if passed, will directly benefit the most important industry of your state. Adams produces Jonathan apples and the original bill requires that a Jonathan be placed in every federally-financed school lunch. If it passes (in a form close to the original), your successful political future is assured—that is, unless you've made too many deals along the way. If it does not pass, you may be forced into retirement. Either way, your score will be ranked in the Hall of Fame if you are among the top forty people who have played.

Your involvement with the bill goes from the authoring stage (with or without the help of a lobbyist) through introduction, committee and subcommittee hearings and mark-up, reporting out (or not), ammendments, passage (or rejection), conferences with the Senate, reporting, adoption (or rejection) by both houses, to presidential signature. At some point during most of the stages, you are asked to make decisions that will bear on the bill's fate—and your career's. Will you let the senior sentator from your state propose the bill you are sponsoring before or after you introduce it to the House? (Not before, unless you want him to get credit for it!) How quickly should you press for passage out of subcommittee? (Not before you have assured the support of representatives from states that produce apples other than Jonathans.) At other times, your knowledge of terms and correct procedures are all that is tested. After each response, you are scored and the results of your decision—if it constitutes a part of the legislative process—are included in the next stage (if there is one). Some mistakes are not fatal; others definitely are.

Success comes when you learn to use (work with) the system. Although some allowance is made for appealing to the public on the matter, this appeal is more in terms of what goes over best on the nightly news than the merits of the bill itself. The fact that the bill is special interest legislation, though, makes its merits and demerits a secondary matter.

How a Bill Becomes a Law should work quite well in the classroom as part of a unit on the legislative process. While the program is not varied enough to play more than two or three times, its constancy makes it a valuable learning tool. Both the documentation and the onboard prompts are clear, user-friendly, and relatively tolerant of moderate errors in judgment, especially in the beginning.

The documentation suggests it may take from ten minutes to one and a half hours to complete play. My experience suggests that most players will finish within a half hour. You can quit the program and return to the same position later. The program holds the names of seventy-five students and replaces a given student's score with a new one if he provides the same name. A teacher may clear the whole list or delete names individually, a handy feature.

Each disk lists a toll free number for technical advice. My call to Intellectual Software regarding a problem with another one of their programs elicited an immediate and helpful response from the customer service representative. Intellectual Software replaces damaged disks for a fee of $3, which in my opinion is a generous policy. If you have a need for software of this type and do not mind the rather expensive price, you will not be disappointed by *How a Bill Becomes a Law.*

INJURED ENGINE

Imagic
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 9-12

Educational simulations have become popular teaching tools. Following that trend, *Injured Engine* introduces you to the fun-filled world of auto repair. (You know, Rocko down at the corner garage who stains your fine mohair upholstery with his greasy coveralls and his assistant, Killer, who scratches the lacquer with his studded bracelet.) Rather than teach you about the whole car, it concentrates on the engine and its supplementary fuel, cooling, electrical, and exhaust systems.

The program serves as a guide to the engine system's individual parts and how they function, or malfunction. You select with the joystick or cursor either the lubrication, combustion, ignition, carburation, fuel, cooling, or exhaust system from the main engine screen. Individual system screens are much more detailed. For example, the idle mixture screw, accelerator pump, float bowl, and power valve are all displayed. Accessing the text icon defines the function of

each part you point to and describes engine difficulties common to each part. This is where the porgram shines.

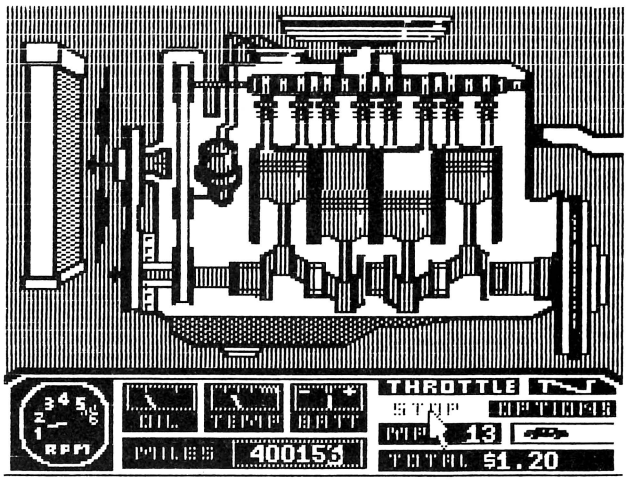
Injured Engine includes two simulations: "In the Shop" and "On the Road." In the former you start with a single engine problem, then multiple problems that have to be fixed. A stop watch times you as you fix all five problems.

"On the Road" puts you out on the road with an engine that has either 1,000 miles (easy), 40,000 miles (medium), or 80,000 miles (hard). The object is to travel a set number of miles while spending the least amount of money. The instrument panel includes a tachometer, and oil, temperature, and electrical gauges. In addition, there is a starter, throttle, cost gauge, and small window that shows your exhaust. The exhaust feature is important because the color of your exhaust can help you diagnose your car's problems as parts begin to wear out. Black smoke could mean that you are burning oil, a symptom of worn engine rings.

Clues to most malfunctions can be determined from system gauges or engine sounds. A bad rattle often indicates the valves are worn. A negative electrical gauge indicates that either the battery or the alternator needs repair. You have a problem with the cooling system if the temperature gauge begins to soar. Other engine problems can be more subtle. The first thing that you need to do is inspect the faulty part by switching to the magnifier icon. This costs money, so you can't just check parts willy-nilly. Once you've found the bad part you replace it by switching to the wrench icon. You can get a price list of all parts in a particular system by switching to the dollar sign icon.

The game is fun at first, especially if you begin at the medium difficulty level. But the fun soon wears thin as parts begin to malfunction at an alarming rate. I have bad memories of my English TR4-IRS that began to wear out after 70,000 miles. It was always in the shop for one thing or another. But *this* engine is so bad the valves have to be replaced every 3000 miles. Perhaps I wouldn't be so critical if it weren't so frustrating. I realize the program wouldn't teach you much if the car didn't break down a lot, but this is too much. Often, when you stop the car to find and fix something minor, you can't restart the engine. You check the ignition system, adjust the carburator, even check the fuel system. It still won't start, even if you find and fix one or two more problems. You often have to fix everything that's wrong, even with the exhaust system, before you can drive again. Now, in real life, you can start a car with a faulty emission system, or one that is low on oil or has a problem with the cooling system.

The engine shows via an mpg (miles per gallon) gauge how well your car is using gas. This is fine for setting the engine throttle to minimize gas consump-



tion, but this reading should begin to decline as plugs and points begin to wear or the valves get out of adjustment. It doesn't. In real life, this would be a clue to a problem in the ignition. Besides, even if you minimize your fuel usage, it is possible to run up a $2,000 repair bill in the first 10,000 miles on the road. Perhaps as a mechanical engineer, I'm overcritical. But these problems are irksome to a professional and tend to ruin the realism of an otherwise fine simulation.

In sum, the program is educational and a good introduction to the workings of an internal combustion engine. The simulation, with its animated running engine, is well implemented. While I've criticized the program, it does present automobile mechanics well in an enlightening and entertaining way.

U.S. CONSTITUTION TUTOR

Micro Lab
$35.00
48K; II/II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 9-12

If your budget runs as tight as mine and you're running out of excuses for your kids as to why you can't help them with their U.S. homework, get this program. When I first saw it, I figured it was another educational program that teaches a little, but really just gives you enough material to call itself worthwhile. Instead, I found a tightly packed disk, filled with everything you need on the Constitution and the three different branches of government. To my further surprise, the second side of the disk contained even more, doubling

the value for your money.

The program basically depends on multiple-choice questions, with the options of skipping questions or requesting help as you need it. Each section lets you return to the introductory page, return to the first menu to choose a new section, call up the Help screen, skip to the next question, choose an answer to the question, or continue with the next question. Since most sections contain close to twenty-two questions, each session covers quite a bit of in-depth material. When you answer a question, you immediately find out if you were correct and get a long explanation of the answer. If you answered incorrectly, you get further information on the answer you chose and the chance to answer again. In this way, you retain much more information than if you had read a passage and then answered questions on the subject covered. The documentation suggests that, after choosing the correct answer, you continue by investigating the incorrect answers to learn the information they contain. This method allows you to make the best use of the program.

The first side of the disk includes the following topics: Legislative Branch 1, Legislative Branch 2, How a Bill Becomes a Law, Executive Branch, Beginner 1, Beginner 2, Intermediate, and Advanced. The second side of the disk includes: Judicial Branch 1, Judicial Branch 2, Amendments, Constitutional Principles 1, Constitutional Principles 2, Rights, Beginner, Intermediate 1, Intermediate 2, Advanced 1, and Advanced 2. On both sides, the Beginner, Intermediate, and Advanced sections contain questions already asked but divided into their own levels of difficulty. You can use these sections as a pre-test, a post-test, or a review of the material contained on that side of the disk.

The documentation also contains a lot of information on the material presented. You need little instruction to run the program, except for turning on the computer, so most of the information echoes that in the program. It includes a self test, charts on the levels of government, and other bits of advice on using the program to its utmost. The limited warranty covers operation for the first thirty days; after that, the company charges a $5 replacement fee. All in all, this very educational program is well worth the money.

KEYS TO RESPONSIBLE DRIVING

CBS Software
$79.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 10 and up

There's no better example than this program to prove the saying that a picture is worth a thousand words. With high resolution graphics, *Keys to Responsible Driving* shows you movements of vehicles in traffic, u-turns, parking on hills, and everything else you normally need to know to take a written driving test. Nine lessons ranging from control skills and handling and maneuvering, to higher-risk driving are presented. For $79.95 you get a nicely packaged program consisting of two disks, a manual with hints, suggestions, and examples, all enclosed in a flashy plastic folder.

First you take a pre-test to find out just what you know. You can start with the first lesson, or at whatever point you choose. While you can't save your position when you quit a session, it is easy to continue from where you left off. The program teaches all the basics that experienced drivers take for granted. One of my young friends remarked that he never knew there was so much to driving. After completing the lessons, you take a post-test (comprised of questions similar to those in the pre-test) to see what you've learned.

As the documentation stipulates, this program won't replace actual hands-on driving experience. But there is nothing to stop you from having fun while learning the basics of driving and staying alive. I wish this program had been around when I was learning to drive.

CAREER PLANNING

CBS Software
$79.95
48K; II+/IIe/IIc

Overall Rating	D+	B	*Reliability*
Ease of Use	B-	C	*Error Handling*
Documentation	A-	D+	*Value for Money*

Grades: Adult

Career Planning, part of the Managing for Success series by CBS software, is an aid for anyone contemplating a career change. The package consists of a program guide and four diskettes. Individual units and

subject areas covered are: Assessing Your Skills and Attitudes, Writing a Career Plan, Strategies for Career Change, and The Art of the Interview.

Assessing Your Skills and Attitudes is essentially an interest inventory of the type of skills you already have, and the importance of values and environmental factors as related to success in career change. The unit on Writing a Career Plan asks you to describe your new career and the parts of your life that will be affected by this change. You make a list of motivating and restraining factors which might help or hinder career change. Strategies for Career Change explores the success rate of various job-hunting strategies and helps you to produce a cover letter and a resume. Finally, The Art of the Interview allows you to actually interview four people for a job, ask typical interviewer's questions, and get feedback on the appropriateness of the applicant's answers.

This program is nicely packaged, easy to use and might be useful to a person who never thought seriously about career change. The opportunity to interview job applicants is the most valuable portion of *Career Planning*, especially if you've never sat on that side of the desk. Least valuable is the interest inventory which attempts to determine root skills and job interests. It's all very nice to list the things you would like to do, but what *can* you do. (I would like to be an astronomer, only twelve years of physics and poor basic math skills holds me back.)

The program promises much more than it delivers. Four disks could be crammed with some specific job skill or personality tests and generally do much more than sorting one's likes and dislikes. There is just not enough substance. The section on writing a cover letter, for example, consists of merely filling in blank lines which are then printed out in a forty-column, all-caps display on the Apple IIe. Technically there are problems, too. Constant disk accessing is irritating and time consuming, and there is no way to replay a portion of a lesson without rebooting.

While this program does have some value, you would do better to buy a less expensive book on career planning.

FIT AND TRIM

Andent, Inc.
$39.95
64K; II/IIe

Overall Rating	F	C	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	C	F	*Value for Money*

Grades: Adult

This program purports to be an easy-to-use, computerized weight control program. It begins with a weight analysis based on standard tables, and then a projection for weekly weight loss is made and a record kept of your progress over a five-week period. The program is both copyable and modifiable.

The Eating Review analyzes your typical food consumption in a twenty-four hour period in terms of percent of calories obtained from sugar, fat, and complex carbohydrates. The program selects the higher caloric carbohydrates and fats for elimination in order to achieve a desirable reduction of weight. There is also an Exercise Review which advises on aerobics and muscle building. Finally, the program displays your complete history.

The documentation is adequate and includes a list of foods which keys into the program in order to evaluate caloric intake.

However, this program cannot be recommended for any serious dietary analysis. The food values are given only in terms of fats and carbohydrates; protein, mineral, and vitamin intake are not assessed. The program runs slowly, and one must tediously keep inserting social security numbers for identification. The advice given is often trite, such as "Use the stairs instead of the elevator." All this information is more readily obtainable from a simple diet book costing less than two dollars. If you are seriously interested in a computerized approach to nutrition, then *The Food Processor* or *Nutrition Design* would be better choices.

PICTURE PERFECT

Mind Play

Picture Perfect, a drawing board program for ages four and up, has extensive features making one of the user-friendliest drawing utilities around. However, a number of drawbacks seriously lower the value of this program. For a complete description of *Picture Perfect*, please see its review in the Graphics portion of the Utilities Section.

Science

DINOSAUR DIG

CBS Software
$49.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Grades: 1 and up

This educational program introduces children and adults alike to the fascinating Age of Dinosaurs eighty-five to one hundred and ninety million years ago. The program and its graphics are exceptional—a definite jump above most of its competitors who purport to teach the subject but in reality bore you and force you to spell each dinosaur's name. With the use of a keyboard overlay, *Dinosaur Dig* frees you to explore and learn without remembering the complex spellings of the creatures' names.

Dinosaur Dig comes on two disks. The first explains many facts about the Age of Dinosaurs. It shows how the continents looked in the Triassic, Jurassic, and Cretaceous ages, as well as which dinosaurs lived on which continents. It shows the skeletal differences between the two different dinosaur families—bird-hipped and lizard-hipped. You can press any of the thirty-two dinosaur keys to see where each dinosaur falls in the family tree. The program shows animated sequences of a Tyrannosaurus eating an animal of another species, an Apatosaurus (Brontosaurus) stretching its neck, a Stegosaurus swinging its tail, a Corythosaurus eating plants, and a Pteranodon (flying reptile) and Plesiosaurus fighting for food. The program even ponders why dinosaurs became extinct.

The second disk has four games plus Dino Discovery, which teaches you all about each of the thirty-two species with pictures and facts. Beside the picture of the dinosaur appear its name (and its pronunciation), length, height, weight, diet, higher and lower order groups, time period in which it lived, and location of skeletal remains (shown on a map). You really need to learn some of the facts and recognize the creatures by sight before proceeding to any of the games.

Dino Dig, a guessing game, asks you to guess five different dinosaurs from the clues given, as if you were a bone hunter who has just found the remains. Clues include such things as size, weight, classification, and time lived. The picture is always the last clue. You get more points for guessing the creature quickly, using few clues.

Dino Flash, a game of electronic flash cards, shows you a creature's picture and asks you to guess its name. If you guess wrong, the picture of the dinosaur whose name you pressed appears so that you can compare it with the original creature. You have fifteen tries to guess as many creatures as possible.

Fact or Fable, a simplistic game, asks you to determine if the two dinosaurs shown on the screen lived at the same time. Don't play this game unless you've mastered the facts from Dino Discovery, because you'll succeed only through sheer guesswork.

Who's Biggest, like Fact or Fable, requires you to know the facts covered in Dino Discovery. Here, you need to remember the sizes of the dinosaurs.

Dinosaur Dig was created under a government grant. It is factually correct and verified by a fossil reptile specialist at the Smithsonian Institute. The documentation, while sparse, simply introduces the material, and includes a bibliography of books about dinosaurs. I personally recommend Colbert's *Dinosaurs* (1983) as the best adult book on the subject.

Dinosaur Dig provides a wonderful introduction to dinosaurs, especially for small children who may never learn to spell those complicated dinosaur names. The keyboard overlay makes it possible for child or adult to merely press the appropriate key to enter the name Quetzalcoatlus. While I question the monetary value for home use (versus the cost of a book), the program offers excellent value for classroom purposes.

BODY SYSTEM SERIES

Marsh Film
$135.00
48K; II+/IIe/IIc

Overall Rating	A	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 3-up

This professional-quality educational software consists of four disks. Each teaches you about a different body system: respiratory, circulatory, digestive, and muscular/skeletal. Each has the same format, screen layout, and tutorial structure as the others, so comments about one disk apply to all.

Each disk has three lessons. To some extent, each lesson builds upon the prior one and a quiz follows each. The third lesson's quiz serves as a general review for all three. The lessons employ excellent teaching techniques, with great variation between screens of information. One screen narrates and allows you to look up a word underlined in red in a "dictionary." Another reinforces a previous fact with a new fact that builds on a review question. (A short musical fanfare rewards correct answers, if you so choose.) Animation might show the blood coursing through the heart or the movement of the ball and socket joint of the hip. Common to every screen of every lesson is a graphic reinforcement of some sort.

The artwork is outstanding—and I cannot praise this strongly enough. The programmer used Penguin Software's graphics utilities in the process, but as good as that utility is, it took some real talent and hard work at the pixel level to accomplish such excellent illustrations (given the limits of the Apple.) These lessons contain no flat, black-outlined, colored-in figures. The Puff of Air of the respiratory system has a credible shape—it looks like a puff.

The program records quiz scores in a hidden section of the program available only to the teacher through a simple password. This excellent feature unfortunately offers no means of printing the scores, so you must copy them by hand from the screen. The documentation is really a teacher's lesson plan, giving educational objectives for each lesson and suggesting supporting activities. The system is supposedly self-explanatory, so only pages three through eight in the twenty-four page booklet describe how to operate the computerized lessons. The remainder of the booklet consists of educational assists.

I crashed one disk twice at the same spot. I find it highly unlikely that this is anything more than a flawed disk, because the other three, which share the same program structure, worked just fine. A call to Marsh Film gave me the following replacement policy: thirty days free replacement no matter what the cause; a free replacement after thirty days if it's their programming error; and $21.75 per disk for replacements if you destroy a disk on your own.

My informal tests throughout the neighborhood demonstrated that this package effectively teaches children from middle elementary through early junior high school. I personally believe that every school should own *Body System Series*. It should get a lot of mileage. For home use, you may find the price a bit steep. At any rate, this outstanding package teaches by fully utilizing the computer as an educational tool.

DYNO-QUEST

Mindplay
$39.99
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 3-6

This game teaches basic facts about eighteen of the most commonly studied dinosaurs, along with the rudiments of strategy. Mindplay lists the age range for *Dyno-Quest* at eight to twelve, but my six-year-old did quite well with it.

The basic scenario is this: you are traveling through time in a space ship with a boy named Donnie. Donnie has a report due on dinosaurs the same day, and needs your help in collecting facts about them. The facts are contained in envelopes that cannot be opened until the sixth envelope is retrieved from the "target" dinosaur. To get an envelope, you have to feed a dinosaur the correct type of food. Some are plant eaters and some are meat eaters. *Dyno-Quest* comes with very thorough playing instructions, and includes some very good playing hints as well.

You travel through three different eras, each of which has a map showing how the five major land masses, or continents, might have looked at that time. You choose an era to look for facts, and the land mass you want to search. After making these choices, you are presented with one of five settings. You can encounter 1) a dinosaur, 2) a non-dinosaur animal, 3) the "target" dinosaur, 4) a natural disaster, or 5) nothing but landscape. All of the above are seen through the "viewer," which is in the center of the screen. The right side of the screen shows a vertical fuel gauge, and the left side shows the amount of dinosaur food left. Underneath the viewer is a pictorial representation of further

options. These include feeding dinosaurs, trading food types with non-dinosaur animals, repairing your ship from the natural disasters you may encounter, and traveling to another place and/or era.

As you can see, there is a lot going on. No doubt this is why Mindplay listed the recommended ages as eight to twelve. However, you can customize some of the options, making it easier for younger children. You can increase both food and fuel supplies, which are the only real constraints on the game. Once the child is adept at acquiring all of the facts, he can work on improving his efficiency, which the program also tracks.

Many facets of *Dyno-Quest* promote learning. Decisions about using fuel and food wisely are very important. You have to remember what you found on each continent in case you want to return there. Once you've collected all the envelopes, Donnie helps you learn more about dinosaurs by reviewing the facts with you. However, I think that the designers should have included an option to change the numbers of facts needed, since older children could stand a little more challenge.

Nevertheless, the sound effects and graphics are so appealing, and each trip so different, that it's a real hit at our house. You will be delighted to see your children learning as they're having fun.

THE SCIENTIFIC METHOD; CHARACTERISTICS OF A SCIENTIST

Cygnus
$39.00 each
48K; IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	B	C	*Value for Money*

Grades: 4-9

Although these two programs come on separate disks, I have reviewed them together since my comments are essentially the same for both. Both are clever, entertaining, informative, and easy to run. I felt as if I were actually conversing with my instructor. You can either review sections from the menu or run through the entire program step by step. You can escape the program at any time. Both respond well to correct and incorrect answers and provide you with amusing and interesting quotes and anecdotes along the way.

In *Characteristics of a Scientist* you learn that a scientist is an ordinary person who is also curious, observant, skeptical, and open-minded. Interesting activities and quizzes help break the monotony found in most tutorial programs. For example, the program instructs you to think of a number and then somehow guesses the correct number after doing a "scan" of your brain. It further reinforces the information covered by quizzing you after you've completed all the sections.

The Scientific Method describes in five steps how scientists solve problems: (1) define the problem; (2) collect information; (3) make a hypothesis; (4) check your hypothesis; and (5) reach a conclusion. You take an amusing and entertaining journey through the program, after which you use these steps to solve a problem about the chirping rate of crickets.

I have two main reservations about the two programs: I couldn't tell the age level they're designed for. Some topics and points are basic and better suited to elementary students; others are more complex and would challenge high school students. Since only one student at a time can interact with the computer, the programs don't suit larger classes. Although enjoyable, these programs just might not see enough use to justify their purchase.

T.REX

CBS Software
$49.95
48K; II+/IIe/IIc

Overall Rating	B	A-	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 5 and up

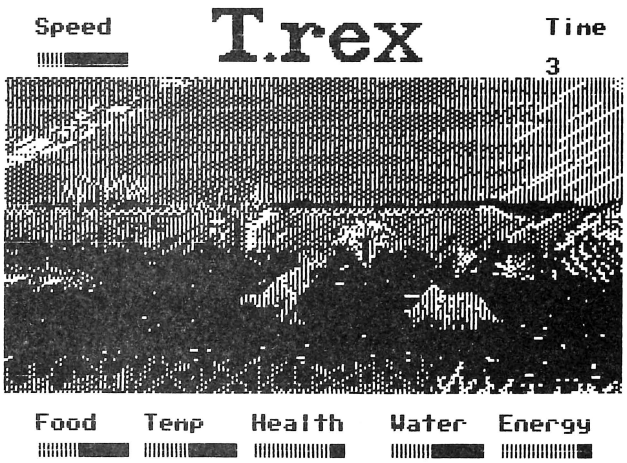
Children are totally fascinated with dinosaurs. They look at these huge creatures in museums and books, then wonder how a creature as strong and ferocious as the Tyrannosaurus rex could have mysteriously died off. *T.Rex* is an outstanding arcade-style simulation that lets you experience, firsthand, what these dinosaurs had to face in order to survive seventy million years ago.

The program is a real-time survival adventure that takes place in five major habitats: savanna, pine woods, marsh (levels one and two), desert, and rain forest (levels three and four). Here you explore the environment in search of water and smaller dinosaurs to eat. All the time, you have to monitor your energy supply, health, and food levels. If you go too long without food or water, or become badly injured in a fight, you die. The object is to eat frequently, conserve energy, and avoid confrontations with the deadly Triceratops, so that you can gain experience and reach the game's advanced levels. These upper levels, where conditions

are harsher and traps (such as camouflaged tar pits) can catch the unwary, also require you to watch your body temperature and water levels. The pace here becomes faster, and rightly so, since experienced Rex can run faster.

The game takes place on a large scrolling landscape and it's not easy. If you attack from too far, you use up all your energy before you catch your prey. Then you can become injured in a long battle. Anatosaurus (a duck-billed dinosaur) is the easiest to kill but he is fast and wary. Ankylosaurus, on the other hand, is more dangerous because he is protected by bony plates on his back and sides, and has a dangerous tail. Pteranodon, a gliding reptile, is very difficult to catch. And Triceratops, with his long horns, is to be avoided, especially when your energy supply is low. You press the action joystick button once to fight, and quickly twice to drink water.

The other button is a help button which brings up a new menu where a player can save a game. Most of the other items on this menu are just help files or descriptions. However, the What-If option allows you to experiment and often makes the game easier, especially for younger children. Here you can vary the dinosaur's speed, the temperature of the environment,



the abundance of prey, and Rex's health.

The documentation is designed for young readers, who are most apt to play the game. It is quite thorough and easy to read. In addition to the manual, there is a demonstration with instructions on a separate disk.

T.Rex is an outstanding program with very good graphics. Instead of just presenting information on dinosaurs as in a textbook, it lets you experience what it must have been like to be a dinosaur. It is not an easy game, however, and might prove frustrating for children under age ten. Still it is a terrific concept that allows players to experience what life was like in eons past.

THE HUMAN BODY: AN OVERVIEW

BrainBank, Inc.
$89.00
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C-	C+	*Value for Money*

Grades: 5-12

BrainBank's *The Human Body: An Overview* consists of eight programs on two copy-protected disks which focus on the major systems in the human body, including the muscular, digestive, respiratory, skeletal, circulatory, and nervous systems. An introduction to the series and a sixty-seven item review test complete the programs, which suit students from the upper elementary grades through high school.

Documentation consists of a skimpy but copyable teacher guide, plus a booklet designed to acquaint first-time users with some basics about computers. The documentation fails to live up to its promise, however. The sketchy teacher's guide offers little help to teachers and the remaining documentation does not describe specifically enough the nuts and bolts of using the program. The effort to develop computer literacy among teachers through the glossary of terms and the section on how a microcomputer works seems misplaced and is not particularly well done.

Naturally, the quality depends on the program itself. The lessons were undoubtedly among the best of their type when copyrighted in 1981, with excellent Lo-Res graphics, clear auditory and visual reinforcement, and well sequenced and carefully prepared lessons. Although described as tutorials, the lessons will probably find more frequent use for drill and practice. Several limitations indicate a need for revamping the program, however. For example, no provisions exist for recording individual progress. No backup disks come with the program. No mention of warranties or licensing agreements for school districts appears in the documentation (although BrainBank is reviewing these policies). Error handling routines are primitive, and you cannot turn off the sound from within the program.

Despite these problems, I was moderately impressed with the program. Certainly it could aid teachers interested in supplementing their usual lessons in human anatomy and physiology.

THE DINOSAUR GUIDE

Omega Star, Inc.
$14.95
48K; II/II+/IIe/IIc

Overall Rating	C-	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	D	*Value for Money*

Grades: 6 and up

The Dinosaur Guide contains about sixty-five pages of information about the age of the dinosaurs. Half of the pages consist of Hi-Res line drawings as illustrations. The information covers the Triassic, Jurassic, and Cretaceous periods plus general information on the beginning and end of the age of the dinosaurs. The program is simple enough to use, employing only the numeric keys and the Return key. The numeric keys let you select subjects from the menu, while the Return key turns the pages as you read the text and study the drawings. Each page shows a poorly done graphics representation of a dinosaur with some text at the bottom. The program requires no interaction with the user. In fact, I just don't see the value of using a computer to turn the pages of a software "book" when you can go out and buy one with better illustrations and more depth for half the price.

Despite the obvious flaws, I thought this program a good first try and would like to see future programs on paleontology that explore the power of the computer as a teaching tool.

THE HUMAN BODY: THE SKELETAL SYSTEM

BrainBank, Inc.
$69.00
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	C-	C	*Value for Money*

Grades: 6 and up

The Skeletal System is BrainBank's first follow-up program to its introductory series, *The Human Body: An Overview*. It's a winner. Suitable for upper elementary through adult students, the program contains lessons on the composition and function of bones, major skeletal bones, joints, ligaments and cartilage, and a review test which yields a percentage score (not percentile, as the program asserts). Lo-Res graphics effectively illustrate major concepts and maintain student interest, but lose most of their impact unless used with a color monitor or television. You have some control over the pace of the lesson ("Do you want to walk, jog, or run through the lesson?"), and you can turn off the sound. Generally, you control advancement from one screen to another, but you cannot back up to a previous screen. Incorrect responses result in neutral corrections (such as "try again") until multiple errors call up the correct answer, at which point the program requires you to type it before proceeding. Teachers must rely on students' reports of their own progress because the program has no means of storing such records.

As with other BrainBank products that I have tried, the documentation is minimal, they offer no backup disk for the copy-protected original, and you get no warranty information. I think it unfortunate that an otherwise fine product producer has failed to take into account the realities of school use of computer courseware. However, BrainBank is planning to follow new policies in these areas, so interested buyers should contact them for details. If shortcomings in documentation and support are corrected, the upcoming programs in the series promise to provide as excellent a resource for educators as does this one. (You can look forward to programs on the muscular, circulatory, digestive, respiratory, and nervous systems.)

TELL STAR

Spectrum Holobyte
$49.95 & $79.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B+	A	*Value for Money*

Grades: 6 and up

This remarkable astronomy tool helps you predict and locate objects in the stellar sky given any location and time on earth during the late twentieth century. It accurately calculates star and planet positions for your time and position. It takes into account inaccuracies, such as the earth's precession, during a nearly five minute calculation. Accuracy typically falls within fifteen seconds of an arc. The program displays a Hi-Res portion of the sky ninety degrees wide. You can choose any direction (north, northwest, west, etc.) and an overhead view. You can press the C key to draw in the constellations in any view. The program can locate any star or planet in its star tables. The view appears with a blinking crosshair pointing to that object. Any key displays information, such as the objects magnitude, right ascension, declination, time of rising, and time of set-

ting. You can also move the crosshair to any object and retrieve the object's name and all pertinent information. If you try to locate an object not yet risen in the sky, the program will inform you of the fact.

Tell Star gives you a code for what different types of objects look like on the Hi-Res screen. Magnitude stars show up in different representations, as do planets and the moon, shown in its current phase. While trying to locate Jupiter, I saw what looked like a planet just below and to the left. Using the paddles to pinpoint the object, I learned that it was the planet, Pluto.

The program comes in two levels. The advanced version ($79.95) has two sets of star tables plus an additional table containing stars and stellar objects for the southern hemisphere. Level I tables contain approximately 180 stars and 13 Messier objects. Table II has fewer stars but 110 Messier objects.

Tell Star also contains a calculation program for converting equatorial coordinates to the horizontal and back; also ecliptic to equatorial. You can also calculate the locations of objects in the solar system without going to the display section of the program.

The well presented documentation comes in a forty-eight page booklet. The booklet contains clear instructions and tables of all objects seen in the program. This program is definitely the best astronomy program to date and very worthwhile for serious astronomers.

MECC SCIENCE VOLUME 3

Compuware
$29.95
48K; II/II+/IIe/IIc

Overall Rating	B-	B+	*Reliability*
Ease of Use	A	N/A	*Error Handling*
Documentation	B	C+	*Value for Money*

Grades: 6-9

This MECC educational package developed for use in the Minnesota school system contains five science programs suited for junior high school students. This rather mixed group covers subjects in biology, astronomy, and geology. They vary widely in quality, from excellent to barely fair.

The most interesting and best program on the disk, called Earthquakes, teaches you how to find the epicenter of an earthquake. It explains the relationship of P waves and secondary waves generated by the quake and the lag time between these two traveling waves as recorded by three widely distanced seismographic stations. After presenting the theory, the program generates random data in graph form for the three stations and asks you to find the epicenter using a keyboard controlled epicenter locater. It then shows the correct location by drawing a circle showing the probable distance of the quake's epicenter as seen from each of the three stations. The three circles intersect at the epicenter.

Minerals, a text program, helps you identify twenty common minerals such as quartz, feldspar, mica, talc, and Calcite. It expects you to use paper, a steel nail, hydrochloric acid, a streak plate, glass, and a copper coin in identifying these minerals. By asking a series of questions, the program narrows the field until it picks the correct mineral. It offers little more than a fancy method of reading a chart of mineral characteristics and doesn't add much to your knowledge.

Ursa briefly identifies five northern constellations and their relationships to the north star. That and their position can help you tell time. Although short and lacking in depth (it could identify more constellations), the program does give a good graphic representation and teaches you to tell time by the stars.

Fish tutors you on the circulatory system of animals with two-chambered hearts, such as fish. Unfortunately, this old program uses crude Lo-Res graphics in its drawings. The organs appear as symbols. The program shows a molecule of blood as it passes through the heart to the lungs and then the stomach, and follows it as it returns to the heart. You should consider this short program just as an extra to fill the disk.

Odell Lake attempts to teach the relative size of six different fish that inhabit the lake waters. You choose a fish. As it encounters each of the different species, you have the choice of eating the other fish, ignoring it, chasing it, or escaping into deeper or shallower water. The results of these encounters determine whether your fish survives. You can then deduce the size of the sixth fish. I found the graphics in this good program entertaining.

GALACTIC PROSPECTOR

EPCOT Educational Media
Division of Walt Disney Productions
$59.95
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	D-	*Value for Money*

Grades: 7-9

The science of geology plays a vital role in the worldwide search for sources of energy. Modern day

energy exploration techniques include satellite and airborne photography, seismic explorations and gravity surveys on the ground, and core or test well drillings when necessary. The scientist, using satellite photographs, can spot certain geological formations, such as a potato-shaped mass of rock called an anticline, which might or might not trap coal, oil, gas, or uranium within its folds. This game allows you to confirm this hypothesis by conducting aerial surveys, ground surveys, and subsurface or drilling tests.

What you are searching for determines which tests you do. Uranium tests include airborne radiometry, mapping, ground radiometry, followed by core drilling. Oil/gas exploration requires aerial photography, air magnetometry, mapping, seismic testing, and gravity, followed by test drilling. These may sound like a lot of tests, but the more confirmation you have, the greater the chance of producing an energy source.

This simulation takes place on a distant planet, Avatar, a geologic twin of Earth. There, you search for energy sources: hydropower, wind, solar, geothermal, oil/gas, coal, and uranium. Exploration and production requires energy of which you have a limited supply, so your continued search requires that you find at least enough energy to power yourself.

The planet is divided into nine sectors, shown on a three-by-three grid. To make your task even harder, the planet is inhabited by unfriendly creatures. Aliens lurk in the distance and may attack one of your successful energy production sources if you aren't careful. Actually, the chances of this happening increase if you perform unnecessary tests—sort of a penalty. You do have shields, but can use them only three times in the game.

The game is entirely menu driven using keyboard commands like "T" for travel, and "D" for drilling. The student views a satellite photo for the sector he is in, then chooses the resource that he wishes to test. For example, if you are along the seacoast where rivers flow into the sea, it is best to search for hydroelectric power. Once you do the appropriate tests and find that rainfall is year round and that the water is low in sediment, you can try to put the resource into production. You may search for oil/gas, but if the geological features aren't there, the odds are highly against you. One good aspect of the program is that it won't perform tests that aren't necessary for the resource under exploration. You can't perform seismic tests if you are searching for coal.

Galactic Prospector is appropriate for junior high science classes. It serves as a good, hands-on introduction to energy exploration. The game's save feature is quite handy in short, forty-minute classroom situations. The graphics are good, especially the aerial photographs and drilling sequences. The manual also serves as a fair introduction to the subject; it is detailed enough to supplement a class textbook. My only complaint is that the program's high price may make it unfeasible for home use.

CHEM LAB

Simon & Schuster
$39.95
64K; II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	B+	B+	*Value for Money*

Grades: 7-10

I have fond memories of afternoons spent in the basement in front of my Chemcraft Chemistry Set during the 1950s. I had the largest set with over fifty chemicals for experiments. Sometimes I would mix according to directions (often not) and watch new chemicals appear in their vivid colors. I never blew up the lab (worse happened), but you could in this computerized chemistry lab from Simon & Schuster.

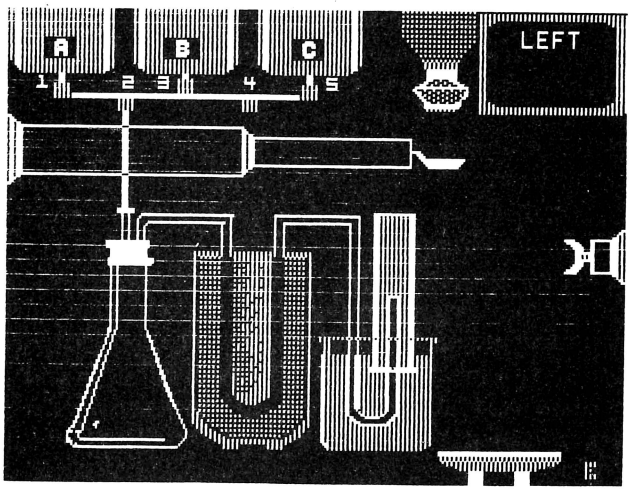
Since today's chemistry sets have nothing but "safe" experiments, most kids find them boring. Usually you can do nothing more than mix some chemicals, test their acidity with litmus paper, or, at best, make some smelly hydrogen sulfide. The authors of *Chem Lab* allow the student to mix some pretty powerful chemicals to make ammonium nitrate (a fertilizer that sometimes explodes), carbon disulfide (rat poison), nitrous oxide (laughing gas), chlorine gas (lethal), calcium carbonate (chalk), sodium flouride (to fight tooth decay), and highly dangerous nitroglycerin. There are fifty experiments in three difficulty levels that involve setting up the experiment with the proper equipment, adding chemicals, and initiating a reaction by adding heat or opening valves to some of the reacting gases in the tanks above. If you blow up the laboratory, the worst that can happen is that you start over.

Each experiment begins with a list of raw materials, a chemical goal, and some elementary instruction. The lab is equipped with two keyboard-controlled robot arms. The right one can only grab and move equipment while the left one, with a variety of changeable tools, can pour liquids, get a spoonful of solid ingredient, or connect a stopper from a flask to either the gas valve above or the gas collector/dryer combination. The beakers, flasks, condenser, dryer, and collector are stored in the equipment bin out of sight. Requesting either equipment or ingredients requires moving the robot arm to the correct position (the "E" at the lower right in the case of equipment), and typing the name of

the requested piece. The same procedure is required to get solid chemicals from the dispenser at the top of the screen. It is a bit awkward, and you must spell the long chemical names correctly. The robot arms are positioned with the four arrow keys (U and D for II+ users), and release or grab with the Return key. The tools used with the left are changed by hitting the space bar. Bunson burners can be raised and lit to add heat.

Experiments are performed by trial and error and require some note keeping. There is a notebook in the back of the manual, but it isn't large enough for all fifty experiments. While beginners may not have a clue about which chemicals might be good choices to produce their goal, a glossary in the back lists the chemical formula for each ingredient. For example, the target chemical carbon disulfide (CS_2) might be made from carbon (C) and sulfur (S), but not lead (Pb) or nitric acid (HNO_2). Generally, you can get a reaction by mixing, say, carbon (C) with an acid like sulfuric acid (H_2SO_4), which has the correct elements. Unfortunately, it produces sulfer dioxide (SO_2) when heated by the Bunson burner. You usually get a message alert after any reaction and you get your results by pressing "M." You must try other combinations until you're successful.

While *Chem Lab* is one of the better science simula-experiment, you must clear and re-setup the equipment after each test. It's too bad you can't just dump out what is in the beaker, but you can't move a piece of equip-



ment that has already been used or uncork a flask once the cork is in place. You need to plan your experiments carefully lest you cork your flask before you pour in the liquids or add the solids. The manual is fairly clear in this regard, but children rarely follow directions.

While *Chem Lab* is one of the better science siumlations available for microcomputers, it doesn't have the slickness or ease of use of programs like *Robot Odyssey* or *Rocky's Boots*. Those programs allow you to grab equipment with a joystick and place them, ready to use, on the screen. *Chem Lab* is awkward in that everything is selected by typing names. At worst it should be menu driven. After all, if they are willing to display your choices, you should be able to select directly from the list.

The experimental approach to chemistry is good in some regards, but there aren't enough formulas or scientific concepts in this program to interest a high school chemistry student without additional guidance by a teacher. I think the audience is actually the twelve to fifteen year old nerd—the one who is too dangerous to use a real chemistry set at home with the extra chemicals he manages to scrounge. Here he can experiment all he wishes, create noxious chemicals, or even blow up the lab, without endangering his parents or neighbors. *Chem Lab* may be safe, but the thrill is missing.

VISIFROG

Ventura
$39.95
48K; II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B	D	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 7-10

Visifrog is a very nice educational program that presents the anatomy of a frog in detail, anatomical data in a variety of ways, and makes excellent use of the Apple's high resolution graphics. Six physiological systems are represented: musculature, urogenital, digestive system, nervous system, cardiovascular system, and the skeleton.

Visifrog is broken up into a study unit, a data retrieval utility, and a quiz machine. The student selects one of these and one of the physiological systems. The study unit presents a drawing of the selected system and flashes a cursor over a part to be identified. The naming of the part is then played like a game where correct letters of the answer (or a complete correct answer) are awarded points. Once it has been identified, a text screen full of information about it is appears.

The data retrieval utility uses the same high resolution pictures as the study unit. Here, the student controls the cursor and selects an item for identification. The item is named and again a text screen full of information is available. The quiz machine is simply a multiple choice quiz about a chosen physiological system. Incorrect answers produce a picture of the system

under consideration with a cursor at the specific area. This occurs until the correct answer is chosen.

Visifrog is very well done. It effectively presents accurate data, and doesn't get sidetracked by flashy gimmicks. My main complaint is with its error trapping; it isn't nearly good enough for a school environment. And that is exactly where *Visifrog* should be—helping students in biology class remember all of those names of frog parts.

THE STARGAZER'S GUIDE

Call Apple Club
$15.00
48K

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 7-12

The Star Gazer's Guide is an astronomy teaching tool used to learn and identify the major constellations and stellar objects in the night sky. The system allows you to familiarize yourself with the overall winter or summer night skies and identify constellations by outlining them. A keystroke toggles the outline on and off for easy identification. Any of forty numbered constellations can then be viewed in greater detail.

Each constellation can be outlined in either geometrical or graphical forms and general information about the constellation is displayed on the text page. The program also has some general displays and descriptions of a galaxy, globular cluster, nebulae and a double star system.

The Star Gazer's Guide is menu-driven for easy access to all phases of the program. Its instruction book includes charts of the brightest stars and their locations and a Messier catalog locating the most common star clusters, galaxies and nebula. The program is well-suited to beginning amateur astronomers.

WRITING CHEMICAL FORMULAS

Microcomputer Workshops
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C+	C	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: 7-12

This tutorial program targets students from grades seven to twelve. The program randomly generates problems based on eleven metals and non-metals, yielding a total of 121 possible chemical formulas. By using the Hi-Res screen, the program can deal with the correct writing of the chemical symbols, including upper and lower cases. A Help key lets you look up the elements and compounds, their names, symbols, and oxidation states. If you give the wrong answer, the program patiently prompts you to the right answer step by step. Also, it displays encouraging messages after each right answer.

Within its stated aims, *Writing Chemical Formulas* achieves its goals satisfactorily. It allows a student to eventually learn all the formulas it generates. However, it does not teach the general principles of writing chemical formulas based on the structure of the periodic table, nor does it teach the underlying rules of nomenclature. It helps if you extrapolate from the specific examples to general principles. Two minor irritations mar the program. 1) The upper/lower case convention here makes upper case the default; Escape toggles lower case. Most other Apple programs use the opposite convention. This inversion leads to typing errors that have nothing to do with your chemical knowledge, but the program treats all misspelled symbols as mistakes. 2) Once in a while, the display says "Oops Missed. Try again?" even though the answer was correct. Another cryptic message says "I wish you could try that again" followed by an entirely new problem.

In summary, *Writing Chemical Formulas* accomplishes its goals of familiarizing you with the fundamental considerations involved in writing a chemical formula and in knowing how to correctly write the formulas that make up its list of eleven metals and non-metals. Whether this suffices for a tutorial program remains up to the individual teacher.

THE PROFESSOR'S PHYSICS SERIES

The Professor
$220.00 (for 11)
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	A	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	C	B-	*Value for Money*

Grades: 7-16

The Professor's Physics Series consists of eleven disks of computer-aided instruction intended as a classroom supplement. You can purchase the disks separately or as a set. This evaluation presents an overview of the entire series, followed by evaluation of the individual programs.

The series covers subjects common in high school or early college physics programs. Students need to know algebra and trigonometry, but calculus is required infrequently. The level of difficulty varies from one lesson to the next, which I consider a strength because it ensures that students of all levels of ability can make use of the programs. A menu at the start of each disk provides convenient access to any program on the disk. You require no special skill in use of computers, although you need considerable preparation in physics for many of the lessons. The entire series rates high in user-friendliness. Because of this, the scanty documentation cannot be considered a serious shortcoming. Moreover, the series is clearly not designed to stand alone, requiring a good physics textbook for reference as well as a wise and patient teacher.

Unlike some educational software, *The Professor's Physics Series* does more than present drill and practice. A tutorial format actually teaches problem solving techniques. Occasional questions check your comprehension. One deficiency is the program's failure to evaluate your answers or otherwise respond to you as an individual. The program offers no expectations to which you can rise. Also, it does not evaluate your performance or record your progress. In fact, you can complete a lesson with little or no effort.

Some of the lessons generate attractive Hi-Res pictures. Although the programs make no provisions for you to print or save results, I found I could make a hard copy of the pictures using a graphics dump program. This could help generate interest in the program as well as give you something to show for your labors. Because the disks are copyrighted and copy-protected, you cannot back them up, nor do you get backup copies with the program. The documentation makes no mention of terms for obtaining backups from the company, so your first investment may not be your last. In addition, I have not seen the series for sale in stores or listed by the usual mail order vendors, probably because of its specialized nature. Certainly I thought the price very reasonable for most of the packages in the series when compared to competitive products. Despite the limitations I have described, *The Professor's Physics Series* is well worth consideration for classroom use. The extensive coverage and meticulously presented tutorials offer hours of challenge to motivated students.

Detailed evaluations of each disk in the series follow. I hope that will provide ample guidance for choosing a disk or two as a trial purchase.

VECTORS AND GRAPHING

$15.00

Overall Rating	B-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	B+	*Value for Money*

Grades: 10-13

Vectors and Graphing includes the lessons Vector Resolution, Vector Addition, Dot Products, Cross Products, Vector Products—Unit Vectors, Vectors and Scalars Quiz, and Graphing Data.

Vector Resolution teaches you how to resolve a vector into its X and Y components. It assumes a knowledge of trigonometric functions. You can request a repeat of difficult passages. Occasionally you perform a calculation, but an incorrect answer does not impede your progress through the lesson. Unfortunately, this lesson relies on Lo-Res graphics, which give the impression that a vector is a row of blocks stacked corner to corner.

Vector Addition shifts to Hi-Res graphics to present a step-by-step procedure for adding vectors. The procedure takes the form of a chart listing the magnitude, direction, X component, and Y component for two vectors and their sum. Once you fill in all the blanks in the chart, the addition is complete. This lesson assumes knowledge of right-angle trigonometry.

Vectors and Scalars Quiz contains a set of true/false questions to sharpen your ability to classify the two.

Graphing Data teaches you how to construct graphs from experimental data. This thorough lesson shows how to properly scale the X and Y axes, how to fit a straight line by eye, and how to determine the slope and intercept. Luckily, it uses Hi-Res graphics.

Briefly, *Vectors and Graphing* delivers just what the title indicates. Its thoughtful creation and reasonable price make it an attractive purchase for the classroom.

STATICS
$15.00

Overall Rating	B-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 10-13

Statics covers the standard textbook approach to this subject in the lessons Statics—Method, Easy Beam Problems, Beam Problems, Ladders, and Inclined Planes. This disk nicely illustrates the value of the computer as a tutor. It tackles the difficult topic of statics in a careful, stepwise fashion using Hi-Res graphics throughout. I got the impression that I was in a classroom watching an expert teacher present the subject. As the lesson unfolded, the program often asked me to anticipate the next step in an involved calculation. Of course, it made no difference if my answer was correct. Computers are naturally infinitely patient, but here I would say patient to a fault because students could easily become complacent.

Statics—Method describes a method for analyzing forces and torques acting on a beam hanging from a hinge and a rope. The forces considered are tension, gravity, friction, and force on the hinge. The lesson advises you at points to copy important information on paper, and even gives hints such as "Work carefully and orderly."

Easy Beam Problems solves the problem of a beam supported by vertical cables. Because of its comparative simplicity, this lesson should appear first on the menu. Beam Problems, in which a weight hangs from the beam, extends the first lesson.

Ladders challenges you to find the minimum coefficient of friction necessary to prevent a ladder from slipping away from the wall against which it leans. Inclined Plane requires calculations on a system consisting of a mass resting on an incline and connected by a cord to a pulley with a weight attached. You must determine the minimum coefficient of friction necessary to maintain equilibrium.

Statics, although effective as a teaching aid, lacks motivational abilities and assumes considerable prepartion on the part of the student. It would appeal only to a serious scholar.

MOTION
$15.00

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	B+	*Value for Money*

Grades: 10-13

Using both sides of the disk, *Motion* presents the lessons Graphing Motion—Parts 1, 2, and 3, One Dimensional Kinematics, Gravity Problems, Projectile, Dynamics—General Method, Motion on an Inclined Plane, and Rotational Acceleration. Tutorial in format, the lessons first present a stepwise method for solving a particular type of problem, then guide you through applying the method. At times you get useful advice, such as "Copy down the methods as we go along." You may need to enter an answer, but a wrong answer does not hinder your progress toward the solution. I would argue that this is a weakness in the program. If you enter a wrong answer, the program ought to take a remedial pathway. At any rate, graphics effectively illustrate the problems. For example, in the Graphing Motion lessons, plots of position, velocity, and acceleration neatly show the relation between these quantities. The program does assume some knowledge of differential calculus.

One Dimensional Kinematics describes a method for solving motion problems with constant acceleration. A Lo-Res block accelerates across the screen, leaving a track as it goes. Next a constant velocity is added. Finally, equations are applied and unknowns calculated. Gravity reinforces the same problem solving methods by applying them to a rock thrown into the air. Projectile employs graphics to depict horizontal constant velocity and vertical accelerated velocity. When these two velocities combine, a projectile crosses the screen.

The remaining lessons take a similar approach. They all lack flashiness, so you may need to encourage students to stay with the program. Rewards await those who do.

CONSERVATION LAWS
$15.00

Overall Rating	B-	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	B-	*Value for Money*

Grades: 13-16

More advanced than the other volumes in the series, *Conservation Laws* suits only the college student. It covers conservation laws only within the field of

mechanics, presenting the lessons Linear Momentum, Angular Momentum, Energy of a Bouncing Ball, Conservation of Energy, Conservative Forces, Non-Conservative Forces, One Dimensional Collisions, and Inelastic Collisions. Most of the lessons are tutorials, using the appropriate graphics throughout to teach skills in solving particular types of problems. Unfortunately, the lessons do not always fully introduce the particular physical law discussed, and sometimes employ symbols without adequate introduction. Except for this limitation, the lessons treat each topic comprehensively.

In Inelastic Collisions, two masses pictured on the screen collide. The program calculates velocity and momentum. Conservation of Energy treats the kinetic, gravitational, elastic potential, and frictional energy of a system consisting of a spring which launches a block into the air. Non-Conservative Forces poses a problem about a mass shot across a table by a spring of known compressibility. You must calculate how far it will travel before stopped by friction. Typical of tutorials in this series, the program gladly does all the work if you let it.

A welcome departure from tutorial format occurs in Energy of a Bouncing Ball. Using a game-like approach, this lesson depicts a bouncing ball which loses a bit of energy on each bounce. In time the ball will come to rest unless you position a small energizing paddle under it with each bounce. You need a game paddle to control the screen paddle. The computer monitors kinetic, potential, and total energy throughout the exercise and displays these parameters on the screen.

This disk suits only the advanced student. Self motivation, a good reference book, and a supportive teacher are essential for success.

CIRCULAR MOTION
$15.00

Overall Rating	A	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	A	*Value for Money*

Grades: 10-13

Circular Motion is my choice as the best of the series. It maintains interest in a subject not inherently interesting. The lessons vary in style and level of difficulty. They include Circular Motion with Constant Speed, Circular Motion with Acceleration, Simple Harmonic Motion 1 and 2, Orbit Theory, and Circular Orbit Game.

The two brief Circular Motion lessons use a tutorial format with moving Hi-Res graphics. You learn terminology and concepts, such as the distinction between angular and tangential velocity. A true/false quiz at the end provides feedback on how much you have learned. Simple Harmonic Motion 1 and 2 offers more quantitative information. An object on the screen moves in a circular path and in projected harmonic motion. Rather difficult calculations challenge you, such as determining the force on a weight oscillating in simple harmonic motion. The lesson offers helpful hints along the way.

Orbit Theory begins with the question, "What Causes Orbits?" You can request an answer based either in terms of balanced forces or Newton's first law. Hi-Res moving graphics then show the moon falling toward the Earth but never arriving. Next, a moving picture of a satellite in orbit illustrates the unique properties of elliptical orbits. In a guessing game you must "Press key when speed is fastest." By trial and error if nothing else you learn that the satellite moves fastest at its closest approach to the central body. Circular Orbit Game, the most exciting part, approaches arcade quality in its requirements for eye/hand coordination. As the astronaut, you must change the orbit of your spacecraft by firing on-board rockets. Your task is to correct the orbit from elliptical to circular. The program gives clues on strategy upon request. Whether you realize it or not, the entire process involves a great deal of physics.

Circular Motion employs an excellent blend of tutorials, quizzes, and games to maintain your interest. Because the level of difficulty varies from lesson to lesson, I never got bored or discouraged. I can recommend this program as a good first purchase for a teacher who wants to sample *The Professor's Physics Series.*

THERMODYNAMICS
$20.00

Overall Rating	A-	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	A-	*Value for Money*

Grades: 10-13

Thermodynamics includes the lessons Calorimetry, Thermodynamic Processes, Thermodynamic Cycles, Heat Engines—Theory, Heat Engines—Applications, Molecular Motion, Gas Pressure, and Ideal Gas Cycles. The most imaginative lesson is Ideal Gas Cycles, which allows you to perform simulated experiments illustrating the Carnot cycle, the refrigerator cycle, or a cycle of your own creation. First you select values for the relevant experimental parameters. Then the program shows a Hi-Res picture of the engine complete with cylinder and piston. It also displays a graph of pressure

versus volume. As the engine runs through its cycles, the computer calculates heat input and work done. By selecting different cycles and varying the parameters you can perform a variety of comparisons using this simulation.

Molecular Motion also deserves mention. Based firmly on kinetic molecular theory, it pictures gas molecules bouncing around in a container. You can change the temperature or the number of molecules and the computer shows you the effect on the pressure.

Calorimetry, a comparatively simple lesson, teaches you to solve classical "mixing" problems. In an example using Lo-Res graphics, you drop a hot object into a cold liquid and apply the Law of Conservation of Energy to calculate the equilibrium temperature. The lesson has a relaxed, pleasing style. Consider, for example, the advice "Copy this equation. Then let's try to solve a problem." The lesson lets you judge the accuracy of your calculations and decide if you need to repeat the explanation. I found this honor system approach most acceptable, certainly preferable to a program that clumsily attempts to diagnose your needs.

The remaining lessons are tutorials typical of the series, thoughtfully created and challenging for a self-motivated student. The most noteworthy element of *Thermodynamics* is its blend of tutorial and simulation, letting you play both doer and observer. Each reinforces the other.

ELECTRICITY AND MAGNETISM
$15.00

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: 13-16

Electricity and Magnetism contains the lessons Gauss's Law, Ampere's Law, Resistor Combinations, Capacitor Combinations, Resistor-Capacitor Circuits, Resistor-Capacitor-Inductor Circuits, and Lorentz Force. As the title suggests, the program presents rather advanced topics. It assumes prior knowledge of vector multiplication and elementary calculus. At the onset, the program advises, "You should already have studied the examples in your text." This is an understatement. The program routinely uses symbols without defining them. Gauss's Law and Ampere's Law take you through a step-by-step tutorial that requires no input except pressing the Return key. The other lessons are a bit more interactive—they occasionally require an answer to a question. Resistor-Capacitor Circuits requires the most from you, asking you to enter values for capacitance and resistance for a circuit. The program then displays a graph of charge and current versus time. You can repeat the exercise with variations.

Lorentz Force examines the effect of electric and magnetic fields on a charge as governed by the Lorentz relation. This straightforward lesson requires no calculations and assumes that you understand vector cross products and the right-hand rule.

This program is solid but uninspired. It offers little more than a textbook study guide would. The level of presentation makes *Electricity and Magnetism* suitable for the advanced physics or electronics student only.

OPTICS
$20.00

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 10-13

Optics utilizes both sides of the disk for the lessons Mirror Ray Diagrams, Lens Ray Diagrams, Lens and Mirror Experiments, Waves, Diffraction, and Laser. Mirror Ray Diagrams and Lens Ray Diagrams are textbook-like tutorials that describe the standard methods for determining the size and position of an object's image in a lens or mirror. Lens and Mirror Experiments simulates a laboratory experiment, allowing you to move an object to different positions in front of a lens or mirror. The computer then draws rays from the object, constructs its image, and characterizes the image as real or virtual. Laser also offers meaningful interaction, first explaining the physical principles behind lasers and then picturing a laser in operation. You control the speed of a bouncing light pulse inside the laser's gas discharge tube. At the same time the computer displays laser performance characteristics on the screen.

Two of the lessons require considerable mathematical ability. Waves explains the distinction between simple waves, complex waves, and traveling waves. It also defines frequency, interference, and wave vectors. It fully utilizes the computer's ability to produce graphics, sound, and motion. The result is most engaging. Similarly, Diffraction teaches interference and diffraction phenomena using phasors and equations plus effective animated graphics.

The level of difficulty varies from lesson to lesson in this good exposition on the subject of optics, so it should appeal to a wide audience. Some of the lessons comfortably reinforce standard textbook topics while others require you to reach far beyond that level.

ATOMIC PHYSICS
$30.00

Overall Rating	B-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	B+	*Value for Money*

Grades: 10-13

Atomic Physics covers several standard topics: Atomic Models, Particles and Waves, Electron Clouds in Hydrogen, Rutherford Scattering, Radioactive Decay, and Nuclear Reactions. A number of the lessons mimic the style of a self-paced, silent movie. Words appear on the screen in ticker tape fashion. Atomic Models provides a historic account of the development of atomic theory, describing the Bohr atom with animated Hi-Res graphics. Particles and Waves explains the duality principle, concluding with a calculation of a de Broglie wavelength. Electron Clouds in Hydrogen is strictly a spectator lesson, generating dot by dot electron density plots for the six lowest energy states of hydrogen. This is beautiful to watch, although somewhat tedious because it takes ten minutes to generate the plots.

Rutherford Scattering is the best lesson on the disk. It briefs you on the principles and equations involved, then challenges you to play the Alpha Particle Game. This game allows you to shoot alpha particles at a gold nucleus. You must enter the proper impact parameter to make the scattered particles hit a target detector. The game makes excellent use of Hi-Res graphics.

Radioactive Decay explains that nuclei emit radiation either by changing the number of neutrons or protons, or by emission of alpha particles. Animated graphics illustrate an alpha particle penetrating the energy barrier to emission. Nuclear Reactions discusses collisions of nuclei in terms of the usual graph of binding energy per nucleon. Neither lesson requires meaningful interaction.

Atomic Physics offers an interesting blend of computer-aided instruction styles. It maintains interest and nicely parallels standard textbook coverage of modern physics at a level suitable for high school or first year college.

SOLAR SYSTEM ASTRONOMY
$30.00

Overall Rating	C+	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	D	*Value for Money*

Grades: 7-10

Solar System Astronomy is the first of two programs on descriptive astronomy, both more elementary than the rest of the series and best suited for junior high school. This program presents Inner Planets, Outer Planets, The Greenhouse Effect, History of the Solar System, Life in the Solar System, and Comets. Once you select a lesson from the menu, you proceed through it as if you were reading a book or watching a film strip. At best, the lessons provide momentary entertainment. They offer no challenge and minimal interaction. Words appear on the screen in ticker tape fashion complete with sound effects. Because floppy disks lack the capacity to hold large amounts of text, the coverage of each topic by necessity remains superficial.

Life in the Solar System is typical, displaying a few paragraphs on each planet, telling you facts about its surface temperature and so forth. After concluding that life could exist only on Earth, the text turns to a brief and uninteresting discussion on the possibility of establishing space colonies. In fact, I recommend this program only for students thrilled by the idea of studying with a computer. Everyone else had better purchase a good astronomy book instead.

STELLAR ASTRONOMY
$30.00

Overall Rating	C-	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C-	*Value for Money*

Grades: 7-10

Stellar Astronomy presents an enticing list of lessons: Types of Stars, Galaxies, Constellations, Sirius and the White Dwarf, Death of a Star, Doppler Effect, Cosmology I, and Cosmology II. Unfortunately, the lessons do not generate the same excitement as their titles. The most sophisticated lesson and the one with the greatest promise, Doppler Effect, explains how the effect occurs in sound waves. Animated Hi-Res graphics nicely show how the effect results from movement of a source relative to an observer. Unlike tutorial lessons in the earlier programs in the series, this one requires correct answers to its questions. At one point, I could not complete the lesson even when I typed in the answer exactly as the lesson said it should be.

Constellations asks you to identify constellations shown on the screen in Lo-Res graphics. I had trouble even recognizing the Big Dipper when all the stars looked like rectangular blocks.

The remaining lessons on the disk likewise require minimum interaction. They are excellent examples of the computer relegated to the role of turning the pages. As a result, *Stellar Astronomy* will interest only that

rare, highly motivated student excited by anything in science. The program lacks cohesiveness and requires entirely too little of the student.

MENDELIAN GENETICS

Merlan Scientific, Ltd.
$45.00
48K; II/II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	B-	*Value for Money*

Grades: 8-10

This program, Volume 2 in the Merlan Biology Series, introduces the experiments and findings of the Austrian monk, Gregor Mendel, whose work became the foundation of the science of genetics. There are two lessons on this disk: the first focuses on the concepts of dominance, genes, phenotypes, genotypes, and monohybrid crosses; lesson two intoduces dihybrid crosses.

Quite a lot of reading is involved in the program. Students test various hypothoses and are quizzed to determine if they understand the material. The lessons also introduce fifteen vocabulary items related to genetics. The terms are not defined in the lessons; rather students are expected to understand the words by means of context.

After reading the appropriate concepts, the students are asked to predict the occurrence of tall or short plants, or wrinkled or smooth pea pods throughout successive generations. An experiment allows the student to "plant" a number of peas and count the number of tall and short plants that result. This experiment is randomly generated and can be repeated, with different results, any number of times. Furthermore, you can boot it up separately from the lessons.

The construction of a Pundit-square table, showing inheritance of traits through several generations is a very valuable portion of the program. The program produces the table, step-by-step, and students analyze it by counting the number of occurrences of dominant or recessive genes.

Mendelian Genetics is very simple to operate and is more interactive than many educational programs. It discusses the concepts thoroughly and involves the students, which keeps them from simply staring at the monitor. *Mendelian Genetics* may be quite useful when used as a supplementary teaching aid in an introductory biology class.

GENETICS COUNSELOR

Microcomputer Workshops
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	C+	*Value for Money*

Grades: 8-12

A biology/heredity program for grades nine through twelve, *Genetics Counselor* displays a randomly generated family tree on the screen and asks, depending on the tree, whether the traits are dominant, recessive, sex-linked dominant, sex-linked recessive, or sex-influenced. You must answer each question with a yes or no. As you answer, the program displays the correct answer to the right. If your answer was wrong, the correct answer appears in inverse, giving you immediate feedback on your mistakes. After you complete the five questions, the program begins to explain each step while indicating the particular part of the tree under discussion. The explanations quickly become redundant, but you cannot stop the explanation even when you answered correctly. Once you have started a series of questions you cannot exit or end early. This could become a problem if you have a time limit to complete the series. After you finish, you have the option of printing out the number of problems with the number of errors for each phase if the printer plugs in to Slot 1 on your computer. The very basic printout does not identify who took the test or the problem where an error occurred.

Because the program was developed using a Hi-Res font system, all systems have upper/lowercase characters on the screen. The graphics interspersed with the text added greatly to the program. The author also tried hard to provide an extremely "friendly" program. Unfortunately, the wording of the examples and the explanations make it difficult to understand the material. Given the topic, you should use *Genetics Counselor* only in conjunction with or as a supplement to a regular biology program.

Overall, I recommend this program for a classroom situation where more than one student would take the quiz. Since the program generates problems randomly, each student would answer a different series of problems. This also allows students repeating the quiz to answer new questions. A useful educational tool.

COMPUTER BIOLOGY LAB: FROG DISSECTION

Cross Educational Software
$30.00
48K; II/II+/IIe

Overall Rating	C	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	C-	*Value for Money*

Grades: 9+

Computer Biology Lab Frog Dissection is meant to be used as a supplement to a high school or college general biology course. The package includes an orientation which merely displays basic terms used in the program, a description of the frog's major structures and their functions, a student-controlled dissection and self-tests to test mastery of the units taught.

In format, this program is little different from a textbook, with alternating pictures and text display. The student "controlled" dissection consists of a picture of the frog in various stages of dissection accompanied by a text describing what is going on. The student can toggle back and forth between picture and text by hitting the return key until he understands each stage. It is best run on a color monitor, although satisfactory in black and white. The self-tests consist of multiple choice, true and false, and a parts identification section in which the student pick letters from a picture to match listed terms. The manual is simply a printed version of the program.

I'm not impressed with *Frog Dissection*. It contains nothing that couldn't be handled just as well by a textbook. With a little more imagination the programmers might have provided interaction by means of the keyboard or mouse so that the student could truly control the dissection process. Students need to be more involved. It may be of some use in the classroom, but is certainly not a good investment for the home.

PROJECTILE MOTION WORKSHOP

High Technology, Inc.
$75.00
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A-	B-	*Value for Money*

Grades: 9 and up

The *Projectile Motion Workshop* is a set of four programs which facilitate the observation and comparison of objects in projectile motion. The concept of projectile motion is fundamental to the understanding of all falling bodies with or without a horizontal component to their velocity. In simplest terms, projectile motion involves a body dropped from a stationary position and allowed to accelerate with the pull of gravity. In more complex situations, it involves objects shot or hurled vertically and horizontally at the same time and allowed to come to rest at points above or below their origin. The *Projectile Motion Workshop* consists of four simulations: *Vertical Motion Only*, *Fire Upward*, *Fire Right/Down*, and *Component Motion*. The programs address the college freshman-level physics or engineering mechanics courses and can be used by the advanced high school student as well. High Technology has provided a useful section in their manual which includes exercises and selected demonstrations for the student, with discussions and conclusions attached in an appendix.

The first menu choice, *Vertical Motion Only*, displays—in Hi-Res graphics—motion in a vertical direction. The body may be dropped from rest, fired vertically upward, or fired vertically downward. The position, velocity vector, or kinetic and potential energies at regular intervals of time can be graphically and numerically shown. There is a feature which allows the motion to be stopped and started, as well as a stepping function which allows the display to advance through the motion one step at a time.

The *Fire Upward* program demonstrates the two-dimensional motion of an object fired at an angle above the horizontal axis. The angle of fire and the initial velocity may be varied within limits. Position, velocity vectors, and kinetic and potential energies at regular intervals of time can be shown both graphically and numerically. Stepping is available.

In the third program, *Fire Right/Down*, you can demonstrate the two-dimensional motion of an object fired horizontally or at some angle below the horizontal. The angle of fire and the initial velocity of the object can be varied within limits. Position, velocity vector, and kinetic and potential energies can be shown both graphically and numerically. Stepping is available.

The *Component Motion* program shows that the motion of a projectile is a combination of: (1) the motion in a straight line at constant speed (uniform motion), and (2) the motion of an object falling from rest. The motions of an object moving at constant velocity, an object falling from rest, and projectile motion are displayed simultaneously. The angle of fire and initial velocity may be varied. Again, stepping is available.

While the overall presentation of the set is outstanding, there is one major shortcoming. There is no provision to print the excellent graphics produced in the programs. It should be firmly suggested to High Tech-

nology that there be a "Dump to Printer" or "Save Picture to Disk" option. Some prints of the graphics are available from HGR1 or HGR2, if you have a printer interface card with a dump program built in, and if you do a Reset with the image on the screen. The illustrated printouts were done in this manner and show some of the excellent graphics available.

While this package might appeal primarily to schools, the software license agreement is a formal legal document which limits the use to one computer by serial number—a disadvantage to those with more than one computer, and the license holds employers strictly responsible for the program. The program claims to be copy protected but is reproducible with currently available bit copiers. However, the source code within the programs is totally hidden to all but the most knowledgeable programmers.

Getting customer support was confusing at first. It required three long-distance calls to find out that a technician is available at a number other than that given in the documentation and then only in the afternoon (Central Time).

Overall, *Projectile Motion Workshop* is a very good program. The menus allow you to proceed smoothly without extensive knowledge of the microcomputer. The Help Menus provided at every stopping point in the program are superb and help to eliminate continual references to the manual. The program is effective, instructional, and easy to operate.

SOLAR SYSTEM ASTRONOMY

Cross Educational Software
$30.00
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	B-	B	*Value for Money*

Grades: 9-up

Solar System Astronomy is Volume 10 in Cross Educational's freshmen college physics series. It covers the barebone facts about the objects in our solar system. Since the package is descriptive rather than mathematical in nature, it suits high school science classes.

The program presents drawings and the latest space probe information about each of our nine planets and their moons. The facts were chosen for their interest value rather than the usual drab statistics. For instance, storm systems on Saturn have winds up to 1,110 MPH. And two moons that share the same orbit in Saturn's ring plane leap frog over each other when they pass.

Each of the planets is shown in orbit around the sun. A demonstration of these planets in motion shows that the planets closer to the sun have a faster orbital speed. The relative sizes and their differences in composition are also shown. Perhaps the orbital characteristics of an approaching comet is the most interesting simulation, since the expanding tail is clearly shown during its closest approach.

There are also lessons about the history of the solar system and the attempts to discover life elsewhere. An adequate discussion on the greenhouse effect explains why the Earth is warmer than it might be without a cloud cover, and how an increase in the carbon dioxide content in the upper atmosphere might produce a warmer Earth.

Each of the lessons is presented with Hi-Res drawings and text. The lessons are animated where appropriate. Overall, the package is nicely-implemented but appears to be suited for a beginning college science course rather than a physics class.

STAR SEARCH

Earthware Computer Services
$45.00
48K; II+/IIe/IIc

Overall Rating	B-	C	*Reliability*
Ease of Use	C	B-	*Error Handling*
Documentation	B-	C	*Value for Money*

Grades: 9 and up

This educational game has a marvelous concept but lacks the proper implementation. In *Star Search* you must select a crew from a small number of specialists (such as planetologists, exobiologists, linguists, and cyberneticists), choose your equipment (including telescopes, expendable landers, gravimeters, magnetometers, and seismometers) and then fly your interstellar exploration ships to a nearby star from which you have received radio signals. As you can see, *Star Search* pulls no punches when it comes to technical terms. The tone of the whole game remains at a fairly high technical level, but the documentation and glossary adequately describe most of the technical words.

After you reach the targeted star system, you discover planets and obtain information by sending landers or atmospheric probes to selected planets. If the expedition consists of more than one ship, you can trade personnel and equipment. Interesting graphics enliven data collection, but the untrained eye may not find them very informative. In some cases, the game's implementation gets in the way of its great ideas. Moving from planet to planet is somewhat awkward, for

example and disk access and execution are slow. Slow graphics really bog down some of the data collection sequences. A small, poorly done "arcade game" sequence during on option should be eliminated, as should the errors in bookkeeping that let you use equipment that you didn't buy while outfitting your ship.

Despite these problems, *Star Search* is a nice game. It introduces technical words and concepts in an exciting and unique scenario. Your score depends on how well you use the resources you have brought with you and on getting back to your solar system safely. An updated version of this game with fewer errors and an improved user interface would be a real winner.

STELLAR ASTRONOMY

Cross Educational Software
$30.00
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	D+	B	*Value for Money*

Grades: 9-up

A variety of programs come on this double-sided disk. The first side, Stellar Astronomy, describes the universe as we know it, giving information and descriptions of stars, constellations, and galaxies. The second side, Cosmology, attempts to explain the origin of the universe. It discusses scientific theories and several religious and philosophical theories.

Information on Stars begins with the Hertzsprung-Russell diagram that displays the general distribution of stars according to temperature versus luminosity. It gives basic data about the resulting groups of stars, such as life span, evolution, and typical size relative to our sun. Death of a Star explains what happens when a star uses up all its nuclear fuel, giving examples for stars smaller than the sun, approximately the same size, and larger. Sirius and the White Dwarf contains animated examples of binary stars and how they orbit one another. A chart shows you how to locate Sirius in the sky. You can set this section as a continuous ten-minute loop for unattended display. Constellations, set up as a quiz program. The star pattern of the constellation is displayed on the screen and you must correctly type in its name. You can display the constellations sequentially or randomly. If you have a hard time guessing the name, you can call up hints. The program also allows you to pick one of the thirty available constellations and display it on the screen. Galaxies presents theories on how galaxies form and displays examples of the different types. A nice animation technique shows an impressive spiral galaxy (the same type as the Milky Way) rotating. Doppler Effect also employs animation to explain the expansion and compression of waves, which plays an important part in determining the speed of stars based on light waves. The program demonstrates this effect using sound waves, and explains how to determine the formula for the observed frequency. A quiz tests your understanding.

Cosmology presents the Big Bang and Steady State theories of creation and their pros and cons. It also explains the creation of elements in the universe. Cosmology II presents ten philosophical theories about the origin of the universe. Genesis 1 and New Consciousness (drug trips) occupy the bulk of this program.

The twelve-page manual does little more than list the menu options and print portions of the program screens. The section called Programming Hints supplies a memory map, tells you how to modify and add to the programs, and explains how to use the Hi-Res character generator called "GRAPE." It provides the manual and general terms for the beginner, while Cosmology challenges you to do some serious thinking.

BASIC CONCEPTS OF ELECTRICITY

Merlan Scientific Ltd.
$275.00
48K

Overall Rating	B	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 9-12

Basic Concepts of Electricity is a comprehensive course in basic electricity at the high school physics level. Its five disks present lessons on the following topics: electrical charge, current, electric potential, meters, current in circuits, potential difference, Ohm's law, resistance, resistance in circuits, energy in circuits, electric power, and cost of electricity. The lessons employ a variety of CAI (computer aided instruction) techniques including interactive tutoring, laboratory simulations, drill, and quizzes.

A typical lesson covers several learning objectives. Subject matter is presented to the student interactively using integrated text and graphics. The hi-res graphics frequently employ animation to enhance their effectiveness. Topics are presented on an elementary level and each lesson presents one equation at most. (The lesson on electric current, for example, uses $I=Q/t$, and

the one on resistance, $R=V/I$.) Questions are asked to ensure that the student understands the material. A correct answer elicits words of encouragement; an incorrect answer prompts a second chance. If your answer is still incorrect, the program provides the correct answer, but you must enter it yourself. Hence, you are constantly involved. You can also request a complete solution to many of the calculations.

Besides these quizzes, a separate disk contains comprehensive tests for a final assessment of the student's learning. These tests contain fifteen questions covering three lessons each. Questions are multiple choice or require numerical answers. You can request immediate grading of each question or only a final score. In either case, an analysis of errors appears after you complete all fifteen questions. The program prints a hard copy of these results for official records.

Some weaknesses of the program include the lack of provisions for skipping ahead in a lesson or returning to the main menu. A fast learner might become bored. Secondly, the numerical questions never require, or even allow, entering the unit of measurement. Students may get the impression that units are of little consequence. In general, the use of dimensional analysis as a problem-solving tool is under-emphasized. Finally, although the documentation gives information about every lesson, I found it awkward to correlate this information with the disks themselves.

Criticisms aside, I do recommend this package to the high school teacher in search of solid CAI in basic electricity. The program has many features which we have come to expect in quality educational software.

CHEMAID

Ventura Educational Systems
$39.95
48K; II/II+/IIe/IIc

Overall Rating	D	C	*Reliability*
Ease of Use	C	D	*Error Handling*
Documentation	C	D	*Value for Money*

Grades: 9-12

Chemaid claims to teach you fundamental facts about the periodic table of the elements, using two programs. One, an element recognition game, lets you pick a group of elements on which to practice and then displays the colorful periodic table, blank except for that section's symbols. You must type in the full name of the element or guess each letter, and win points for correct answers. After you complete each element, the program presents a screen of information about that element.

The other program, a data retrieval utility, simply lets you access the same information. You can choose an element by name or symbol and then read the screen of information presented.

Now, about the information. Primary facts such as name, symbol, atomic weight, and electron configuration are correct. However, there are two other categories covering uses and special properties which provide not only misleading, but sometimes completely incorrect, information. For example, the program lists potassium as a radioactive element. Wrong. Only certain isotopes are radioactive. It also lists jewelry as the first use for copper. Finally, the program does not discuss the fact that most actinide metals are either radioactive or man-made or both. You'd find the information in a good dictionary or mediocre encyclopedia more accurate.

Besides being a program of limited educational value, *Chemaid* is also poorly error-trapped, a condition that makes it poorly suited to classroom use.

EXPLORING YOUR BRAIN

Epilepsy Foundation of America
Free to schools
48K; II

Overall Rating	A	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	N/A	*Value for Money*

Grades: 9-12

The Epilepsy Foundation of America produced *Exploring Your Brain* as a public service with the goal of promoting understanding of how the brain works and how sometimes, as in the case of epilepsy, it does not. Through education, the Foundation strives to eliminate misconceptions surrounding this often feared disorder. The program targets high school students and is available free to secondary teachers upon written request.

This tutorial program keeps students involved and interested through frequent questions and multiple choice quizzes, plus effective Hi-Res graphics throughout. It consists of four learning units. "The Geography of the Brain" identifies the major parts of the central nervous system and describes the functions of various parts of the brain. "The Circuitry of the Brain" explains what neurons are and how they work. When neurons fail in the job of impulse transmission, an epileptic seizure can result, as discussed in "When Brain Cells Misfire." The final lesson, "Brain Malfunction and Social Response," describes the symptoms of a seizure,

teaches first-aid treatment, and explores emotional responses people commonly have to epilepsy victims.

Although not flashy, this program offers state-of-the-art computer assisted instruction. That, along with its serious purpose, provides reason enough to recommend it.

TRIBBLES

Conduit
$40.00
48K; II/II+

Overall Rating	B	B	*Reliability*
Ease of Use	C+	B	*Error Handling*
Documentation	B	C+	*Value for Money*

Grades: 9-12

Tribbles, by Conduit, is a copyable educational program. Made for a standard 48K Apple II/II+, the disk can be muffined from 3.2.1 to 3.3, if so desired. Five duplicate student tutorial manuals come with the program. This tutorial, attempting to introduce the student to valid scientific methods of problem-solving, sharpens the student's investigative techniques by presenting the computer-simulated puzzle of an imaginary planet called Conway. The student acts as the head of a scientific team investigating life on alien planets. A space ship is sent to Conway; and while orbiting this planet, a camera probe takes a daily photograph of the planet's surface. The surface of the planet has a gridlike pattern and on it dwells a small, round, fuzzy organism that is called *Tribbleus gardnerii,* or "Tribble" for short.

The computer prints a pattern that replicates the "photographs" taken by the probe at one-day intervals. The computer then shows what happens to a set of Tribbles in a given pattern over a period of time. The student can alter the pattern and the number of days. The student, assuming that the Tribbles are like terrestrial organisms, arrives at a sound explanation for Tribble life on the planet Conway.

The manual teaches the student how to make accurate observations, how to be systematic, and how to organize his observations of the Tribble population. Guidelines, testing predictions, and step-by-step tutorials are presented in the 43 page manual. The student is taught how to summarize his or her observations using answers supplied in the manual. In my observation of this program, it is for higher level education rather than for use in primary schools. The deductive power of the student has to be sharp, and, to some degree at least, already scientifically-oriented.

SHORE FEATURES

Teach Yourself by Computer Software
$24.95
48K; II/II+/IIe

Overall Rating	B-	C-	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 10 and up

Shore Features instructs you on the various geologic features of the beach and shore zone through the use of full color, high resolution graphics plus text. It targets senior high school and introductory college students. You can complete the entire course in a minimum of twenty minutes; you also get the options of reviewing areas of weakness and testing your knowledge.

Upon starting the program, you first see a view of the shore area under discussion, then you see the Main Menu with its five options: Tutor, Test, Review Material, and Stop. If, for any reason, you have pressed Control-C or Reset during the course, you must re-boot the disk to ensure a complete graphics display. Since the manual documents this well, it should cause few problems.

The Tutor section starts by showing a full color scene of the beach, water line, and offshore area. After explaining the name of each area and pointing them out, you answer study questions. These multiple choice questions replace the graphics on the screen, so you must remember the name for each section. If you choose anything except A, B, C, or D, the program reminds you of the choices available. If you answer incorrectly, you get a modified version of the same question. A wrong answer at this point returns you to the beginning of the section and you repeat the lesson. Upon completion of the questions, you return to the Main Menu.

Next comes the testing unit. These questions, unlike those in the Tutor section, require you to answer with the complete name of each feature of the beach/shore area. If you make mistakes in spelling or spacing, the program considers the answer wrong. This makes the questions more difficult, but better judges your knowledge. After completing the test, you get a percentile grade showing your overall knowledge of the subject. The program does not keep a permanent file of the grade you earned by taking this test. You can use the test as a pre-test, a post-test, or a combination of both in the classroom.

The last part of the menu, other than exiting the program, allows you to review the material. This section contains the only faults I found in the program. You can view any text screen or illustrations by picking the screen/figure numbers shown on the review menu,

but I found that when I chose one of the last of the figures, the graphics slowly self-destructed on the screen. Only by beginning at the first figure and continuing on from there do the graphics properly appear on the screen.

Overall, *Shore Features* is very well constructed and user-friendly. The information, although limited in scope, covers its topic very well. The graphics are clear and easily viewed on both color and monochrome screens. I certainly recommend the program to teachers planning a course that includes this topic.

EVOLUT

Conduit
$45.00
48K; II

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 12 and up

Conduit's *Evolut* is an educational program made for a 48K Apple II with Applesoft and a 13/16 sector boot. The disk is copyable; if desired, it can be Muffined from 3.2.1. up to 3.3. Five copies of student note manuals come with the program, which also includes a Teacher's Guide.

This educational program is a complete unit of introductory work on the mechanism of evolution and population genetics. An elementary knowledge of genetics, ecology, and an ability to calculate percentages and plot graphs, is the background you need to make any progress with this program. The student will be able to learn about the power and importance of natural selection in producing fluctuations in gene frequencies, and eventual specialized adaptations from random genetic combinations. A hypothetical population sample is given in which factors affecting variation are defined; from it the student should be able to predict the course of evolution.

Using this program, the student familiarizes himself with the theory of evolution and begins to understand how natural selection operates. This also involves studying adaptations found in Darwin's finches and woodpeckers, and uses computer models of pea genetics to investigate how selection alters allelic frequencies. A knowledge of alleles, dominance and recessiveness, homozygotes, and heterozygotes (including gamete formation and fertilization), is necessary in order to be able to use this program successfully. The program is based on the pea model, and the problems posed by the program should help the student gain experience in changing various parameters in the selection of the homozygotes, and so forth.

The program allows the student to use and investigate population sizes up to 500; anything greater would be unrealistic. This is a college level subject, and would not be practical for anyone who does not have at least some basic knowledge of the theory of evolution.

HARMONIC MOTION WORKSHOP

High Technology, Inc.
$75.00
48K; II/II+/IIe/IIc

Overall Rating	A-	B	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A-	B	*Value for Money*

Grades: 12 and up

The *Harmonic Motion Workshop* is a set of six programs providing an easy method for observing and comparing objects in harmonic motion. The concept of harmonic motion applies to an understanding of the generation of radio waves as well as the description of motions of bodies such as pendulums, weights on springs, and others. The *Harmonic Motion Workshop* consists of six simulations dealing with harmonic motion: simple harmonic motion (SHM); amplitude and phase; amplitude, phase and circular motion; time plot of (SHM); damped harmonic motion (DHM); and time plot of (DHM). The programs appear aimed at the entry level college student in physics or engineering mechanics as well as the advanced high school student. High Technology has provided a useful section in their manual which includes exercises for the student, with discussions and conclusions attached in an appendix.

The first menu choice, "Simple Harmonic Motion", displays in high resolution graphics the horizontal motion of a pendulum swinging back and fourth. Various options allow the display of relative velocity or acceleration vectors, as well as the relationship between circular and harmonic motion. Another shows the relative amounts of kinetic and potential energy in the pendulum at each point in its travel. One option stops and starts the motion, and a stepping function allows the display to advance through the motion one step at a time.

The "Amplitude and Phase" program lets you vary the magnitude of motion and the relative position (phase) of two bodies in harmonic motion. Velocity

and acceleration vectors are available in this program with and without stepping.

In the third program, "Amplitude, Phase and Circular Motion", we see the visual relationships between linear harmonic motion and circular motion. Amplitude and phase are user adjustable, and stepping is available.

The "Time Plot" program is one of the most effective demonstrations. It compares harmonic motion with a plot of position versus time. This allows a clear display of the relationship between circular and harmonic motions and electrical phenomena. Velocity and acceleration vectors can be plotted against time, and stepping is again available. Those vectors are first plotted at the instantaneous position of the body, but are then translated to the x-axis for comparisons of phase relationships among position, velocity, and acceleration. First and second derivatives of the position function are displayed as velocity and acceleration plots.

In "Damped Harmonic Motion" you are shown a screen similar to that in the first program, except that in addition to the previous functions the user can apply a variable damping force on the harmonic motion. Velocity and acceleration vectors, stop/start, stepping, kinetic, and potential energies are all available with damping.

"Time Plot of Damped Harmonic Motion" is the most effective of the programs. Once you have mastered the foregoing basic concepts, the program allows you to plot position, velocity, and/or acceleration with or without a variable damping force. Stop/start and stepping are permitted. This selection contains the most options for displaying instructional time plots and easily lets you simulate various damping forces at or near "critical."

While the overall presentation is outstanding, it is within the last program that one major shortcoming becomes evident. There is no provision to print the excellent graphics produced in any program. High Technology should include a "Dump to Printer" or "Save Picture to Disk" option. Some prints of the graphics are available from HGR1 or HGR2, if you have a printer interface card with a dump program built in, and by doing a RESET with the image on the screen. Also, while the program performed in an excellent fashion, there was one flaw noted during testing. Within "Damped Harmonic Motion" the graphics image got "confused" and displayed duplicate velocity or acceleration vectors if valid commands were given too rapidly. The other programs had no such problems.

While this package may have appeal in the schools, the software license agreement is a formal legal document which limits its use by serial number to one computer. This might be a disadvantage to schools or those with several computers, and the license holds employers strictly responsible for their employees' actions with the program. The program claims to be copy protected, but is reproducible with currently available bit copiers. However, the source code within the programs is hidden to all but the most knowledgeable programmers.

Getting customer support was confusing at first. It required three long distance calls to find out that a technician is available at a different number from that given in the documentation, and then only after noon, Central time.

Overall, "Harmonic Motion Workshop" is a very good program. The menus allow the user to move smoothly through the program, and to progress without extensive knowledge of the micro computer.

The Help-menus provided at every stopping point in the program are superb; they eliminate continual references to the manual. The program is effective, instructional, and easy to operate. Its minor flaws do not detract from the overall product performance.

PHYSICS GEMS

Cross Educational Software
$35.00
48K; II/II+/IIe/IIc

Overall Rating	C+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B-	*Value for Money*

Grades: 8 and up

To appreciate *Physics Gems* you must first understand that it extends well beyond physics. Upon booting the disk, you first encounter a menu titled Science Gems—an appropriate title for the full package. The menu gives you a choice of five subjects: Physics, Chemistry, Astronomy, Math, and Computer Aids. Within each category you may select from a list of as many as ten programs, some tutorials and some utilities or simulations. The programs vary greatly in sophistication, thus offering something to students from elementary school to college. I will describe the programs by subject category, touching upon the simpler ones within each category first.

Among the Physics programs, "Metric Height and Weight" is most elementary. It converts your height and weight into centimeters and kilograms. An on-screen stopwatch turns the computer into a timer. Press the button on your paddle (or the Closed-Apple key) to start the stopwatch and press again to stop it. The program then displays the time interval to one-

thousandth of a second. "Home Energy" allows you to set the parameters of a house, such as its size, construction materials, type of heating, and the outdoor temperature. The program computes heat flow to the outside, heating requirements, and total energy cost. You can then change the parameters to study the effects of the changes. "Thermal Expansion," a tutorial, uses Lo-Res graphics to show why the coefficient on area expansion of a material is about twice as large as that of linear expansion. "Damped Harmonic Motions" allows you to enter values for an object's mass, force constant, damping constant, and driving parameters. The program creates a Hi-Res graph of the object's motion over time. Change the values and you get another plot for comparison. In "Gravity Equipotentials," you enter the masses of as many as three objects plus their coordinates. Lo-Res color graphics show lines of equal gravitational potential. "Electronic Equipotentials" resembles it, but you enter charge rather than mass.

The Chemistry programs include a laboratory utility entitled "Finding Absolute Zero." After you enter experimental temperature-pressure data for a gas, the computer produces a graph of the data and performs a least square fit to find absolute zero. "Box of Molecules" pictures molecules bouncing around in a box. As you add more molecules the probability decreases that all will be in the same half of the box at any given moment. "Random Walk" can enhance a study of gas diffusion rates. This program depicts a point taking a random walk around the screen and monitors the position coordinates and number of random steps. You can then determine the relation between diffusion distance and time. "Reaction Rates" claims to teach chemical equilibrium, but I found it confusing and ineffective as a teaching tool.

Of the Astronomy programs, "Weight on the Planets" will interest younger users. You enter your weight on earth and the computer lists your weight on the other planets. "Comet" invites you to enter the velocity of a comet circling the sun. The program then displays its orbit. "Ellipse," a tutorial, shows you with Hi-Res graphics how to draw a particular conic section using string and pins. "Retrograde Motion of Mars" shows you the movement of Mars through the sky. After fifteen days the planet has traced a loop in the heavens. "Moon Flight" requires an adventurous nature. You choose a starting velocity for a space craft that must leave a planet, circle its moon, and return safely. More than one solution succeeds, but others end in a crash or a flight into space from which there is no return.

The Math programs include the briefly entertaining "Sine Sign," which asks you for a word or short phrase and then prints it repeatedly in a column that wiggles sinuously. "Square Root" is more serious. Without help from a calculator you must estimate the square root of a number from one to one hundred, randomly chosen by the computer. The program generously allows up to a five percent error. "Inflation" shows how prices rise yearly based upon your choice of inflation rate. Clever programming allows "Factorial" to calculate factorials much larger than your pocket calculator can handle. Discovering how the program does this offers a learning experience in itself. In "Least Squares" you provide X and Y data and the computer makes a graph. The three remaining programs are considerably more advanced. In "Fourier Synthesis" and "Square Wave Synthesis" you select the parameters and the programs graph the waves indicated by their titles. "Fourier Analysis" lets you enter points on a grid and finds the sine and cosine terms which combine to fit the points.

"Computer Introduction," the first program on the Computer Aids menu, is an elementary tutorial on the Apple II+ keyboard—little use to an Apple IIe owner. "Graph Paper" draws a rectangular grid in accordance with your choice of lines per inch. You can have the resulting grid printed out and use it as you wish. "Graphics Tutor" explains the coordinate system of the Hi-Res screen and allows you to plot points to test your comprehension. "Grades," a teacher's helper, converts student test scores to percentages, assigns letter grades, and constructs a graph of letter grade distribution. "Text with High Resolution Graphics" teaches you how to print words on the graphics screen. The program uses Apple's shape tables and the DRAW command to enable you to put letters into your graphics.

Briefly, this package includes a random collection of math and science programs. Admittedly, some are amateurish, but even they serve an educational purpose. Because the disk is not copy-protected, you can list any program, study it, and tinker with it. You can also use a graphics dump program to easily create hard copy of the many Hi-Res graphics generated by the programs. Whether at home or in the classroom, this package provides an effective answer to the question, "What can a computer do in math and science education?"

ECOLOGICAL ANALYSIS PROGRAMS PLUS

Oakleaf Systems
$39.95
48K

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	B	*Value for Money*
			Grades: College

Ecological Analysis Programs Plus is a set of specialized computational programs intended for use by students in a college level experimental ecology course. It

is designed to supplement *Field and Laboratory Methods for General Ecology* by Brower and Zar, or any similar text.

The programs all use a similar format: you enter data and the program applies suitable formulas to calculate the relevant parameters. The data entered may be experimental values actually obtained from the field, or they may be made up for the purpose of simulation. New data can be entered with each exercise or it can be read from a storage disk. The programs are easy enough to run with only the onscreen prompts serving as documentation. After the program has performed its calculations it displays the results in neat, tabular form. Both data and results can be saved on disk or sent to a printer for hard copy.

Descriptive Statistics calculates standard measures of central tendency for individual items or values with frequencies. Median, variance, standard deviation, and standard error are all determined. Data input can easily be changed to study its effect on these parameters.

Life Table Data Analysis can tabulate mid-age class numbers, beginning age class numbers, or deaths during an age class. The program displays a complete cohort analysis, including number alive at the start and midpoint of age class, number dying during age class, probability of surviving or dying during age class, cohort age class time left to live, and life expectancy for age class. This program is excellent for running simulations.

Community Similarity Indices calculates indices of similarity from data input on taxa names and numbers in each of two communities. The indices are the Jaccard coefficient, quotient of similarity, percent similarity, and Morisita's index.

Diversity Indices calculates Simpson's diversity, Simpson's dominance, and Shannon-Wiener diversity from data on taxa names and sample numbers.

In the program, Mark-Recapture Data Analysis, the Lincoln-Peterson method or Schnabel method is used to estimate population numbers along with confidence levels.

The Lotka-Volterra Predator-Prey Model applies classical differential equations to describe a predator-prey system. A plot of predator number versus prey number is displayed. In simulation exercises, the effect of radical changes in predator number can be explored.

Regression and Correlation Analysis performs a linear regression analysis on input x,y data. Standard parameters such as the slope and intercept of the line are displayed. A hi-res graph of the input data and the best straight line fit can be called to the screen. Of all the programs, this one is the most generally useful.

Documentation supplied with the package is brief and does not attempt to replace the texts which the package supports. Before running the programs, the student must understand the scientific principles which serve as their basis. Evaluating this package is difficult because it is one of a kind. Its highly specialized nature greatly limits its audience. If this is what you need, and you're not a programmer yourself, these programs are a good deal.

NEUROMUSCULAR CONCEPTS

Biosource Software
$49.95
48K; II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: College

Neuromuscular Concepts is a tutorial program developed in cooperation with Harper and Row and is meant to be used as a supplement to college texts on anatomy and physiology.

There are five tutorials on three disks. Subjects include: Muscle Action Potentials, Using the Electromyogram, Skeletal Muscle Contraction, Muscles in Action, and Disorders of Movement. Each tutorial contains a glossary, informational pages, and a multiple-choice review question after each page. In addition to tutorials, the last disk contains individual review tests for each subject and comprehensive twenty-five and fifty-question multiple-choice exams. The tests may be taken as often as desired. The program keeps the three highest scores (percentage correct) on file.

The program is easy to use. Feedback in tutorials and tests is given immediately. Some of the multiple-choice questions, however, are not that difficult; good test-takers can pick out answers easily. The graphics are adequate and useful, although there could be more of them as opposed to text. The tutorials seem short and leave you with a feeling that more detail could have been provided. Of course, the textbook will fill in for much of this.

Neuromuscular Concepts is best utilized as a text supplement in an appropriate college course. Making multi-user copies is encouraged. In exchange, teachers are requested to send in a $5 royalty payment for each copy made. For the period of one year, Biosource will replace defective products at cost. Additionally, upgrades are available for the cost of shipping and handling. These are very realistic policies for educational software; too bad not many other companies are doing the same.

PRINCIPLES OF PHARMACOLOGY

Biosource Software
$49.95
48K; II/II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: College

This program comes on three disks and is meant to supplement college, graduate, and post-graduate pharmacology courses. In fact, it provides good review and reinforcement for a first pharmacology course.

Disk One presents the origins of pharmacology in a very cursory manner. The highlights are stressed and each page is followed by rather obvious and simple questions.

The second part of this disk deals with pharmacokinetics and in a very diagrammatic and effective way covers absorption, transformation, excretion, and site of drug action. The receptor mechanism is well outlined. The functions of the various receptors, agonists, and antagonists are stressed in explaining the mechanisms of drug action. Emphasis is laid on the movement of drugs from the blood plasma, where free and protein bound drugs are found, to biotransformation and excretion. Factors responsible for drug movement through cell membranes are thoughtfully diagrammed and the distribution of drugs in the various fluid compartments is graphically and simply stressed. Each protocol is followed by questions which emphasize the importance of data previously presented.

Disk Two presents advanced pharmacokinetics as well as pharmacodynamics. Pharmacokinetics II stresses general principles and gives a good graphic review of basic mechanisms. The biotransformation and elimination of drugs by degradation and synthetic mechanisms is particularly well described, as is the ultrastructural basis for drug action at the cellular receptor level. The program moves easily through fairly complex material, taking about four to six seconds to call up each page.

Reinforcement of the important feature on each page is made by the simple questions which follow it. Incorrect responses call forth full and appropriate explanations, as do the correct answers. Unfortunately, while it is easy to move backwards through the various protocols, to move forward you have to tediously answer the questions each time. This makes quick review of the material impossible. An appropriate glossary is readily available at any point to define pharmacologic terms.

Disk Three deals with drug safety and effectiveness and includes a comprehensive test of the whole program. Terms throughout are defined very precisely. The final portion is the twenty-five- to fifty-question test which the computer grades for you.

This could be a very useful program for the pharmacology, nursing, or medical student, in the early phase of training. It is well designed and reliable and moves freely and without error. Only a two-page pamphlet accompanies the program, but no documentation is really necessary since all the directions are found on-screen. The material is uptodate and well presented. I hope this program is followed by others dealing with the various classes of drugs currently used in therapeutics.

SKELETAL MUSCLE ANATOMY AND PHYSIOLOGY

Biosource Software
$49.95
48K; II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C-	C	*Value for Money*

Grades: College

Developed in concert with Harper and Row, this tutorial is meant to be used as a text supplement for college level courses in anatomy and physiology.

Skeletal Muscle Anatomy and Physiology is composed of three tutorial/test disks and a three-page manual. The subject areas covered by the programs are: muscle categories, skeletal muscle units and microstructure, sliding filament and muscle lever theory. The tutorial format consists of reading a page of information and being tested on that page. All tests are multiple choice. The final disk contains a tutorial, a ten-question test for each unit, and two comprehensive tests of twenty-five and fifty questions each. Each unit has its own glossary.

The program is simple to use. Tests can be repeated as often as you wish; scores improve with repetition. Presentation of the material is adequate but uninspired. The content is presented in the form of a text with some graphics, somewhat like the old programmed instruction books. This program in particular seems a little less interesting than others I have reviewed by the same company. There just doesn't seem to be enough material, and what there is is not presented in an interesting way.

I wish I could say better things about *Skeletal Muscle Anatomy*. Biosource has a very enlightened software policy which provides a one-year warranty and upgrades at cost. It also has a realistic copying policy for educa-

tors. This program, through repetition, will help students study for tests (especially multiple-choice ones). It is relatively inexpensive, but not terribly involving.

CYBERLOG

Cardinal
Quarterly Subscription:
$495.00/Individual
$795.00/Institutional
64K; IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: Adult

At last, a medical education program which utilizes the unique capabilities of the computer to provide expert tutoring in a subject which is daunting to most medical students and simply ignored by many practicing physicians. The understanding of Fluid and Electrolyte and Acid-Base Balance is mandatory in providing care, based upon sound physiological principles, for complex medical and surgical problems.

This program is apparently the first of a series to be published quarterly. Its three disks include: tutorials, case studies, and tools.

The tutorial program covers six areas: Hyponatremia, Polyuris, Acidosis, Metabolic acidosis, Renal tubular acidosis, and potassium balance.

Hyponatremia explores the concept of osmolality. The various abnormal osmolar states are clearly delineated. Particularly useful are the graphics, which depict these states and the electrolyte and body space changes that go with them. The diagrams are responsive to manipulation. Thus, by graphic addition of various fluids and electrolytes, the student can witness the dynamic change in the intra and extracellular compartments, and the movement of solute particles from the one compartment to the other.

Concomitantly, the concentration of extracellular sodium and intracellular potassium visibly changes in response to the manipulation. Continually available for consultation and especially accessible on a two-drive system is "TOOLS," a compendium of formulas, nomograms, and intravenous solutions. The nomogram depicting acid-base abnormalities is particularly striking. By moving the cursor in any direction you can simulate any problem, from concentrated metabolic acidosis to hyperventilation and respitory alkalosis. The defense mechanisms seeking homeostasis respond dynamically to the manipulation.

The excellent manual is designed to be part of a loose-leaf collection. It is well-written, concise, and summarizes modern theory in a few pages in a most pointed manner.

The other tutorials listed above are handled in essentially the same manner.

Each tutorial has a companion case study which outlines a clinical problem then poses questions based upon the teaching material in the tutorial. Some of these involve only clinical decision making while others require calculation. Especially gratifying is the immediate response to each question. This helps greatly in reinforcing the recently acquired knowledge.

The learning objectives are clearly set out and a written examination can be submitted for nine credit hours of A.M.A continuing medical education credit.

The program runs consistently and easily. All commands are simple and given appropriately on each screen. No computer experience is required.

One could ask little more from an educational program that utilizes the computer to the fullest and is accompanied by a manual which brings forth all the simple values of the written word. I have only one criticism: Where was this program when I struggled through dry volumes of physical chemistry in Medical School?

Math

SUCCESS WITH MATH

CBS Software
$24.95
48K; II+/IIe/IIc

The *Success with Math* series consists of four programs: *Fractions: Multiplication and Division; Fractions: Addition and Subtraction; Decimals: Multiplication and Division,* and *Decimals: Addition and Subtraction.*

TEASERS BY TOBBS

Sunburst Education
$55.00
48K; II/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: Preschool-Adult

Teasers by Tobbs makes addition and multiplication fun and challenging at the same time. Tobbs is a funny little guy who wears glasses and likes to tease people with his puzzles. He's not totally wicked, though—he'll give you a hint if you ask.

The grid on which you play looks much like a tic tac toe game. The mathematical operator appears in the upper left corner of the screen, a "+" for addition or an "x" for multiplication. Two squares lie to the right of the operator, with two more beneath it. The squares intersect to form four more squares, making eight in all. Depending on the difficulty level, a number of squares may remain blank. You must determine the correct number to insert in each blank square when Tobbs requests it. The first level suits very young children. The difficulty increases until you reach the sixth level, where most of the squares are blank. At this level, there may be several correct answers with numbers ranging from zero to one hundred.

You can play the game with one or two players. Although technically the game only uses addition and multiplication, you also use the skills of subtraction and division to get your answers. When you answer incorrectly, Tobbs shakes his head as if to say "No." Get it right and he does a somersault to celebrate and tells you "That is correct."

The well written and organized manual, aimed at children, suggests timing your responses, but I wonder why they didn't include a timer within the program using the Apple clock. Anyway, the game is fun without timing even though it would benefit from bonus points awarded for faster responses. The program could also have included a children's spreadsheet trainer. After all, the grid has a definite similarity to a very small spreadsheet. With a little extra programming, it could function as an elementary introduction to spreadsheets.

Despite these minor missed opportunities, I found *Teasers by Tobbs* a fun way to test and practice mathematical abilities. As with other educational software, I'd like to see a lower price, but this fine program is well calculated to help budding young mathematicians on their way.

KNOWING NUMBERS

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: Preschool-2

Knowing Numbers, part of Learning Well's extensive Software Library, offers "playful software for serious learning." Using the same format as *Letters and Words*, this package presents number and counting games to foster math readiness. Children need no reading skills to proceed happily through the games; they simply answer picture questions posed by the computer.

Game 1 provides practice in matching the numerals 1

to 10 with groups of numbered objects. The child must understand the meaning of the equals sign. In Game 2, players must count the number of boxes stacked on each side of a seesaw and decide if the seesaw tips down on the side with more boxes. Game 3 demonstrates addition by bringing together two boxes containing triangles. The player decides if the sum created equals that in another box appearing on the other side of an equals sign. In all three games, the child responds in the same way: he or she presses the space bar when the proper picture of the four that appear at the bottom of the screen is framed in white. For example, the first picture shows a head nodding "Yes."

The utility menu available to the teacher enhances the program's value. It allows you to see a performance summary for the last child to complete the program and lets you set the scores to zero for the next. You can also change several game parameters, such as the number of rounds in a game and whether Game 3 presents addition or subtraction. As with all software from Learning Well, the documentation is excellent. It suggests supplementary activities which further the program's goals in the classroom.

I can suggest little to improve this fine program. Some competitors may offer more entertainment, but they provide less flexibility. First-time players will need some coaching—the package extends but does not replace the teacher. Also, since no backup disk comes with the package and since a replacement costs $20, you should advise little people not to spread jam on the disk.

INTRODUCTION TO COUNTING

Peachtree
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

Grades: Pre-3

John Conrad's *Counting Bee* has here been newly named, packaged, supported, and priced by the Peachtree people. The program itself has not been changed. *Introduction to Counting* tries to teach young learners ages four to eight (the earlier release listed ages three to six) the concepts of counting, addition and subtraction, shape discrimination, and comparative length and weight using numbers no higher than nine. Eight different learning modules in entertaining hi-res graphics hold the young child's interest. In the default mode, deliberately short lessons use sound effects and melodies to reinforce correct responses. Sad and happy faces keep track of the child's progress and also report back to the parent or teacher via the learning module.

First, the child meets the concept of counting. He must determine which of three arrangements contains a certain number of blocks, and use the space bar to move a check mark to his choice. The second lesson reinforces the concept of "how many" by asking the child to count colored circles that roll off a platform and bounce once before stacking in a column on the left. Assisted by the sounds of bouncing and "filling up" (the scale), the child learns to count each circle, one by one. Once he masters simple counting of one shape, the student is asked to distinguish a specific shape (of a different color) in a field of objects. In each lesson, if the child types in the wrong answer, the program slowly counts and identifies each of the items of the requested arrangement or shape.

The program uses graphic presentations to teach comparisons of length, height, and weight. Water rushes from a faucet into a graded container. The child must count the number of height markings to determine the water's height. Then a random number of blocks weigh down two sides of a scale that are held in even balance. Again using the space bar, the pupil chooses which way the scale will tilt when it is released. The next lesson shows five different columns, to present the concept of length. The student must correctly type the relative length of each column after they have been taken out of ascending order. Finally, the last two games embody the concepts of addition or subtraction, through numbers paired with groups of blocks.

The learning management module adds a dimension of control for the parent or teacher. You can learn the child's score on each of the lessons and customize the program for the child.

Introduction to Counting is an excellent teaching tool for young learners. It helps the child learn numerical concepts in an entertaining, interesting way. This is a very important consideration in programs for children of this age group, who have a notoriously short attention span.

Peachtree includes a Customer Assurance Program for registered software. The program includes a 90-day replacement warranty with a $25 replacement charge thereafter. In addition, customers can call a number for technical assistance and may purchase upgraded versions of the software at discount.

NUMBER FARM

DLM
$29.95
48K; II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: Preschool-3

This disk from the Early Childhood Software series by Developmental Learning Materials is designed for joint parent and child play—a high-tech version of the picture book of old, but with excellent color animation and top-notch sounds and music. The clearly written instruction booklet, free of computerese, suggests ways to use the programs in order to get the most educational value from them. The company will replace defective disks free within the first six months, or for $25 after that.

Number Farm teaches the numbers from 1 to 9 (no 0 for some reason) with a down-on-the-farm theme. A master of ceremonies—a farmer—nods his head and gives the "OK" sign for a correct answer, shakes his head and makes a raspberry for wrong answers, and doffs his hat for excellent performances. The package includes six sections:

- Number Farm provides an elementary introduction to numbers.
- Old MacDonald, a counting game, uses the familiar "Old MacDonald Had a Farm" song. It's cleverly done and the music uses the show-biz technique of rising pitches to avoid monotony.
- Crop Count adds the element of speed in counting the number of items flashed on the screen.
- Hen House, a two-player competition, introduces the concepts of "greater than" and "less than." Clues help you guess how many eggs the hens have laid.
- Animal Quacker produces animal sounds. The duck quacks, the dog barks, the cow moos. You count the number of sounds. The program rewards you with bottles of milk, colored ribbons, and an exercise in aural recognition. Good sounds.
- Horseshoes shows you how many horseshoes it wants you to throw. You signal the farmer's son to toss horseshoes (a ringer every time) and stop when you think you have the right number.

This package makes learning to count fun, in addition to introducing children to computers at a very early age.

MATH MAGIC

Mindplay
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: Preschool-4

Math Magic combines game-playing with solving math problems. As in the arcade classic *Break Out*, Six rows of bricks appear which you eliminate by bouncing a white ball off a paddle. Behind the wall is a "monster," whom you defeat in the same way. At unpredictable times, the monster appears with a math problem which you must solve in order to make him go away. Not to worry, though, if you get it wrong, the computer will correct the problem for you and Mr. Monster disappears. At the four-year-old level the problems involve simple counting, while the other levels (five through nine years) require solving addition and subtraction. You can control the paddle with the arrow keys or a joystick.

The graphics are very well done and work effectively as incentives in the "presents" mode. This is a mode where all correct answers yield a present in the form of a picture such as a horse, an ice cream cone, a car, etc. These appear and remain in the left and right margins of the screen. On the other hand, the "monster" mode only stores the monsters you have "captured" at the end of each level, at which time a new wall appears with a new monster hiding behind it. Each new level shortens your paddle, and speeds up the ball.

You have considerable freedom of choice as to the types of math problems used (with the limits of addition and subtraction), and the difficulty of the game at the starting level. Consequently, we were able to make it fun and challenging for my ten-year-old as well as my five-year-old. You can choose between addition, subtraction, or a combination of the two. Problems can involve carrying, borrowing, or both. The number range can be set from 1 to 99, and the problems can consist of two or three numerical values. I found this type of design latitude to be very useful since my two younger children are just learning arithmetic, and I was able to design a set of problems to meet their needs exactly.

Mindplay describes *Math Magic* as "A Monster-filled arcade game that teaches counting, addition, and subtraction." Indeed, this is an accurate description since it is more of a game that incidentally teaches than an educational program that incidentally is a game. At first, this bothered me since my children were playing five times as much as they were learning. However, my

opinion quickly changed when I saw how enthusiastically they played. While there is plenty of educational software for the four-, five-, and six-year-old, there are few games. My five-, and six-year-old envied their older brother for his library of educational-plus-game programs. As time went on though, all of the kids were getting through the walls so fast that their time of play vs. their time of learning began to equal out. Therefore, they learned more as they played better. The educational value then became quite enhanced.

Damaged disks can be replaced for $5.00, and backup disks can be purchased for $7.50. I would highly recommend *Math Magic*, especially for the child who is still looking for the fun in education.

BUMBLE GAMES

The Learning Company
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C	A-	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B-	D	*Value for Money*

Grades: Preschool-5

Bumble Games introduces the concept of numbered pairs, and allows the child to plot graphs or find objects on a map in a series of six increasingly complex games. First, the child encounters the concept of greater than/less than as he attempts to guess a number between one and five. If he guesses incorrectly, a greater or less than clue is given. Once this one-dimensional game is mastered, the child advances to a two-dimensional game called Find the Bumble. Here, the child must find the Bumble hidden in a 4 by 4 array. The coordinates are numbered in one direction, and lettered in the other. This concept is reinforced in the game Butterfly Hunt. Visit from Space and Tic Tac Toe teach the concept of coordinate points at the intersection of two lines. In the former, a spaceship is hidden at the intersection of two lines. The coordinates are numbers on each axis. Likewise, when an X or an O is placed in Tic Tac Toe, the position is determined by typing in the coordinates for the X,Y coordinate pair. Finally, the principle of graphing a picture is shown in Bumble Dots. The child chooses a picture such as a boat. A dot appears on the screen. If he types in the correct coordinates separated by a comma, the computer connects the dots with a line. Otherwise, the typed coordinate pair is shown by an X on the graph, indicating the child's mistake.

Bumble Games is a good educational package that clearly illustrates the concepts of number lines, numbered pairs, and graph plotting. Although the games are recommended for children from four to ten years, I would say the upper limit is eight. The program, however, is overpriced.

ALLIGATOR MIX

DLM
$44.00
48K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: K-3

Alligator Mix, an arcade-style math game, best suits children from kindergarten through third grade, but students in higher grades could benefit if they used the game for remedial learning or to quicken their computation skills. To play, you can use one of three keyboard options or the Fire button of a joystick or paddle. The Fire button offers an advantage only if you want to sit further back from the monitor than the keyboard allows. Apples containing addition or subtraction problems drift toward a waiting alligator on the right side of the screen. The alligator contains an answer. If you decide that he contains the correct answer for the problem in the approaching apple, you open his mouth. If not, you leave his mouth shut. Five correct decisions result in another alligator materializing above and slightly ahead of the first, and so on up to five alligators. Three wrong decisions for any alligator cause it to sink back into the swamp, and when you run out of alligators, the game resets (for a total of three times or until time runs out). You can adjust the speed so that the apple takes from one and a half to ten seconds to reach the alligator, the run time of the game (from one to five minutes), and the problem number range (zero through three, six, or nine). Even though each alligator lies slightly ahead of the one below it, you have time to change your mind before the apple reaches its mouth.

As in other games of the Arcademic series, *Alligator Mix* contains appealing graphics, whether on a monochrome or color monitor. For example, when a new alligator materializes you see his eyes first, peeking out of the water, then his snout, and finally his body. This occurs during the last two out of five correct decisions, encouraging you to keep choosing correct answers in order to bring him completely to the surface. Sounds also tell you whether the answer is right or wrong, while a running score appears at the bottom of the screen and between games. High and low scores, shown between

games, offer the possibility of setting up competition between players.

Although no instructions appear onscreen, you can begin at the preset levels with little instruction. Changing program options proves slightly more complicated, but a teacher or parent would probably want to monitor this anyway. Flashcards, a teacher's manual, worksheets, and progress reports provide an excellent means of regulating a child's progress, as well as making the game part of a math program. A toll-free number was no longer in operation, but I needed no help anyway.

EDUFUN MATHFUN! GAMES

EduFun!, Milliken Publishing
$39.95 per disk
48K; II/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: K-8

Each disk contains two mathematics games and shares characteristics with the others. Each comes with instructions and a reusable scorecard. The directions are fairly clear, but offer no provisions for purchasing a backup copy of the copy-protected program disk. Each game also offers onscreen instructions which the player can opt not to watch. Most of the games keep score for each player and all have a "manager" function which allows a parent or teacher to review scores. Advertised for specific age groups, the programs target them well. Graphics and sound effects are uniformly excellent; you can turn off the sound effects—a nice touch. The only technical problem I noted was that hitting Control-C crashed the program. You can recover only by starting over. Older players might not find this a serious problem, but my little testers accidentally crashed the programs often and became very frustrated. Nonetheless, I found all the games equally well designed and fun. Which one you choose depends on the age of the children who will use it and the action that most appeals to you. Any one gives good value for the money, especially since each disk holds two completely different games.

Aliencounter and Face Flash

Designed for children five to nine years old, *Aliencounter* shows a spaceship hovering over a line. A number also shows on the screen. By pressing the plus or minus keys the child lands the same number of aliens from the ship as shown by the number on the screen, from three to ten. Hitting Return tells whether the answer is right. If the child chooses correctly ten times in a row, the program displays a reward message. Pressing the S key also ends the game.

Face Flash displays up to forty-nine little faces on the screen for a short time, then asks how many faces appeared. Each correct guess means that the next set of faces appears for a shorter time.

Children older than six might find these games too easy, but they might like them for remedial work. The games are fun, and make learning number recognition painless.

Jar Game and Chaos

For ages six to ten, *Jar Game* shows two containers filled with orange and green spots. First, the child must guess which jar the fly will choose, knowing that it likes honey (the orange spots). Choosing the jar with more orange spots than the other wins two bonus points. Then the child must press Return each time the fly looks like it will land on a honey spot. The game teaches hand-eye coordination as well as probability. It also moves fast and is fun to play. The child plays against the computer, but several children can play at once with the computer keeping score.

Chaos requires the child to maneuver a spaceship using the I, J, K, and M keys to catch asteroids of the same shape and/or color as the sample shown in the middle of the screen. The sample changes often, and the child has a limited amount of time to choose. If the child captures the wrong asteroid, the game ends suddenly. It teaches shape and color recognition and hand-eye control. The action is good and fast, yet well geared to the age group.

Gulp and Arrow Graphics

For ages seven through twelve. *Gulp* teaches multiplication or addition by requiring the child to solve the problem before the big fish catches up to the little fish and eats him. The child chooses either multiplication and addition, an easy or hard level, and slow or fast action. Fast is difficult and challenges older children, while slow is less anxiety-provoking and suits younger ones. Those who save their little fish get to play a bonus game. *Gulp* is not only openly educational but positively exciting.

Arrow Graphics requires the player to duplicate a pattern by writing a simple formula. This teaches problem-solving and direction. It also challenges, but differs widely from the other game.

Both games are interesting and original. By combining levels of difficulty and speed, players can create a new experience each time they play.

Battling Bugs and Concentration

Designed for ages nine to twelve. In *Battling Bugs*, armies of red and blue bugs head toward each other.

When they meet, the matching bugs eliminate each other. The rest march on. The child must stop them by calling up an equal number of bugs of the opposite color. Since the numbers sit along the top of the field, the child cannot always choose an exact number and so must march sets of bugs against each other until the correct match results. The game conveys the concept of positive and negative numbers excellently.

Concentration presents a board covered with lettered panels. By specifiying each letter, the player can see the fraction hidden underneath. Either a number or red and white blocks represent the fraction. By remembering which panel covered a similar fraction (after reducing), one player defeats another. This game holds your interest enough that a child and adult can happily play against each other.

These well designed games teach fairly sophisticated concepts in a playful way. Children can play both games just for fun.

Frenzy and Flip Flop

A subtraction/division version of *Gulp*, *Frenzy* seems even less forgiving. An alligator creeps inexorably across the board while the player desperately divides or subtracts to keep the little fish alive. Good action and excellent math drill.

Flip Flop presents two figures, either different or the same but side to side or end over end. The child must specify the problem. A very challenging game that teaches figure recognition.

Golf Classic and Compubar

Billed for age nine and up. *Golf Classic* shows a diagram of a golf course and requires each of up to four players to specify the angle at which the ball must travel and the distance to get to the green. The sharp graphics and good play action successfully hide the very real geometric skills practice. Children will never guess that this is an educational game if you do not tell them.

Compubar provides practice in reading graphs and mentally adding and subtracting numbers to reach a goal. The computer draws a bar which the student must match by adding and subtracting the lengths of other bars provided. The player presses the plus sign to add a bar and the minus sign to subtract a bar. Pressing the S key shows the result. If the computed bar matches the goal bar, the player wins and the program displays fireworks.

MATH SEQUENCES

Milliken Publishing Company
$450.00
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: K-8

Milliken's *Math Sequences*, a program for both teachers and students, grades 1-6, consists of 12 diskettes providing drill practice in math in the following areas: addition, subtraction, multiplication, division, negative numbers, fractions, decimals, percent, and the laws of arithmetic. Each sequence provides problems ranging from simple to complex which can be successfully implemented in a range of school environments and tailored to an individual student's needs. Math problems, presented in low resolution graphics, are stated in several problem formats with appropriate reinforcement and chances to try again if answered incorrectly. In addition, *Math Sequences* includes a review of concepts prior to introducing new ones.

The student's progress is constantly monitored by the computer and students are advanced only when specific achievement criteria have been met; or students can be moved back a level until they have mastered the concept.

Each diskette holds a total of 100 student records and five class records. Teachers enter students' names on each individual sequence disk and make the appropriate assignments. When a student enters his name on the computer, it automatically takes him into the sequence and generates problems at the level assigned by the teacher. The student's work is scored immediately and upon finishing a drill session, the program updates the student's records and stores the information in the student's file. Thus, the teacher may review his progress at any time. A display of the student's progress shows where the student is in the assignment, the number of problems done, the percentage correct and, in addition, if the assignment has been started, a graph of the student's progress will appear. A print out of the student's progress can be obtained with either a parallel or serial printer. Upon completion of the student's work, his/her name may be deleted, enabling the teacher to add another student in his/her place.

This program includes excellent documentation and packaging. The teacher's guide provides a thorough explanation of disks as well as four duplication masters, and a step by step guide to operating the computer.

ADDITION WITH CARRY

Microcomputer Workshops
$24.95
48K; II+/IIe/IIc

Overall Rating	B	A-	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

Grades: 1 and up

Addition with Carry provides an educationally sound approach to the drill and practice of addition using a carry. It targets students in grades one through three, but I think it would benefit remedial study in addition by students in grades four through six, as well. The program selects problems randomly. You select the size of the problems, up to nine numbers and nine columns. The cursor locates the position of the next entry, one digit at a time. You enter the sum of each column as well as the carry above the next column, including zero for no carry.

You must concentrate while using this program and enter a number at each step. Excellent and immediate feedback lets you know when you made an error or rewards you for correct responses, using your name when doing so (necessary when working with young children). If you err a second time, you get the answer and continue with the problem. The step-by-step method effectively teaches the correct procedure for solving addition problems with carry—extremely important in teaching this math concept.

I fear that the lack of entertaining graphics may lead to boredom. Moreover, first and second graders could not read the instructions. *Addition with Carry* is not self-directed, but it does help teach the concept and is worth the money. I should note, however, that I strongly believe in drill programs.

PUT TOGETHER, TAKE AWAY

Media Materials, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 1 and up

This very friendly tutorial program helps you master addition and subtraction, from simple operations to carry or rename functions. In each category you can choose one of four tracks: simple problems with a time constraint, multi-digit problems with no carries or renames, multi-digit problems with one to three carries or renames, and setting up (rewriting) of problems followed by an attempt to solve them. In each untimed track, you have the choice of an instruction, practice, or quiz mode. If you choose the easier mode and realize that you're ready for the quiz, or if you encounter difficulty and want to get into an easier mode, you can get out of the one you're in by pressing Escape.

In the timed quiz, you can choose from one to one hundred one-digit problems to solve, choosing a time range of 1-540 seconds. The problems appear in boldface in the middle of a "blackboard"; time elapsed and score appear in a lighter color in the bottom corners. You can correct your answer using the arrow key up until the point you press Return to enter it. The sound option pings each second and trills for correct answers. The program simply crosses out incorrect answers and progresses to the next problem. At the end of the quiz, the program compliments you by name and tells you how many goofs you made, shows the corrected problems, and tells you how many problems you didn't get to in the allotted time. The program then politely asks you whether you want to continue, return to the menu, or quit. If you stop, the program bids you good-bye and asks you to turn off the computer.

The carefully constructed tutorials cover multi-digit problems, problems with carries or renames, and problems that require rewriting. Within the three modes mentioned above (instruction to quiz), the program clearly prompts you as to what you must do to solve the problem and move on to the next phase. It also provides a changing visual display, utilizing a smaller or larger blackboard which occasionally erases itself, and friendly intervention after one or two mistakes (depending on the mode). You can press "H" for help at any time.

Either the documentation or the on-screen instructions are sufficient for you to use *Put Together, Take Away*. You can replace a nonfunctioning disk free, plus postage. As a whole, the program generally responds quite well to errors and mis-strikes and is well paced.

MATHEMATICS WORD PROBLEMS Grades 1 and 2

Queue Intellectual Software
$24.95 (each)
48K; II+/IIe

Overall Rating	B+	B+	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: 1-2

Mathematical Word Problems helps students improve thinking skills. The Grade 1 package includes counting, numerical order, addition, and subtraction, using numbers from zero to ten. Word problems on the Grade 2 disk feature addition and subtraction of numbers up to 100, money problems, telling time, simple fractions, dates on the calendar, and beginning multiplication and division. Ten modules in each program, with varying difficulty and skills, challenge the student to analyze and solve word problems in a logical, step-by-step manner.

Problems are presented as a series of related concepts. The programs explain the concepts, give examples, and present exercises to strengthen understanding. For Grade 1, short stories present the problems. At this level they are fairly easy, the easiest requiring answers of only 1, 2, or 3, with more difficult problems going up to 10. Questions are either multiple choice or fill-in-the-blank. For the multiple-choice questions, the student only has to type in the correct letter, with the other questions he must type in the correct words or numbers.

Animated color graphics provide illustrations of each problem and hold students' interest. In some modules, an audio tone is used to signal the presentation of an important concept. Wrong answers prompt the computer to supply a hint and a second chance.

Student scores are displayed at the end of each module, and are automatically recorded in the management portion of the disk. Only ten student names and files can be held at one time, so the teacher will have to clear some or all files periodically. You can print out a report of student names, modules completed, and percentage correct for a permanent record.

These programs are easy to use and provide students with needed understanding of word problems. However, first graders and older slow-learners will need help reading the problems.

Intellectual Software provides a toll free number for customer assistance, and replaces damaged disks for a $3.00 fee.

FAY: THAT MATH WOMAN

Didatech Software
$29.95
36K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: 1-3

Fay uses the number line concept to provide students in grades one through four with a game to help them sharpen their arithmetic skills on six levels: addition, subtraction, addition and subtraction, multiplication, division, and a combination of all four operations. The program generates problems randomly. The answers are positive numbers ranging from zero to eighteen, with no fractions or decimals.

After booting the disk, select the desired level or Help from the menu. The playing screen shows a box at the bottom containing the problem, the point value for the correct answer, and the current score. Above the box lie five number lines arranged in layers. Let's say that the first problem is 5 + 4. Fay stands at the left side of the screen, impatiently tapping her foot while you decide on your answer. When you do, Fay starts to pace off the problem, takes five steps and pauses, then takes four more. You did enter nine, didn't you? Fay jumps in the air, waves her arms, and rises to the next level on her little elevator, accompanied by a cheery tune. What's that? You didn't enter nine? A Bronx cheer for you.

Depending on where you are in the game, Fay will either give you a second chance or drop through a trap door to the next level down. Whichever, she always shows you the correct solution. At levels one, two, four, and five, one game consists of three screens (fifteen lines) with ten points for each correct addition and subtraction problem and twenty for multiplication and division. But be careful—if you delay too long in entering your answer, the point value starts to go down and the problem that follows a wrong answer always earns only one point. Levels three and six, called Elevator Math, run by slightly different rules. Play continues as long as you can keep Fay from getting "randomized" by the random numbers that crawl up the levels after her. If you beat the current high score, Fay asks for your name and stores it on the disk as a goal for the next player.

This program is a good tutor. Use of the number line and immediate feedback constitute strong points in the program. The number line graphically illustrates the relationships between numbers when adding and subtracting, and proves especially good at demonstrating

multiplication and division. Fay's emotional responses encourage you when victorious and mildly criticize you when defeated. I also agree with the author's comment that showing a woman with good math skills may help break down some stereotypes. However, there are a couple of traits I didn't like. Although the author claims that the game contains no violence, Fay appears consumed by random numbers when she gets randomized in Elevator Math. Nonviolence means no violence—or should. Also, I found no way to reset the high score feature for a new class of students or new generation in the home. In common with other math drill programs, this one repeats the same question several times because of the random generation. I must admit that this program is better than some regarding this flaw, but it still annoys me and you can expect it to happen occasionally. Despite the minor faults, I think this is a good program and a good value for the money. Only please, try never to get randomized.

HEY TAXI!

Media Materials
$39.95
48K

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: 1-4

Hey Taxi combines two activities in one program: an arcade game and arithmetic exercises. The clever touch is that the exercises are the reward for succeeding at the arcade game.

In this game, you are a taxi driver who must beat the competition (the Acme Cab Company) to a fare by maneuvering through the mapped streets using the arrow and letter keys. If you can do this without crashing or having a flat, you will be confronted with a math problem. Solve the problem and you collect the fare and are ready to hit the streets again. Fail to solve the problem, and you lose the fare. Enough failures, breakdowns, or speeding tickets, and you end your shift with a net loss.

Taxi is quite versatile as a teaching tool. You can select addition, subtraction, multiplication, or division problems at "junior" or "senior" levels. If you correctly answer three problems in a row, the program raises the difficulty level of subsequent problems. Given the fact that none of the numbers are more than two digits, *Hey Taxi* seems most suitable for lower elementary grades.

The program nicely anticipates the likelihood that players who do well in the arcade game portion may not do as well with the math problems, or vice versa. Even though you must succeed in both areas to finish your cab-driving shift with a profit, each kind of success brings its own reward. A congratulatory sound and message leads to another chance for profit for the arcade winner, or a chance for the player who answers all the arithmetic problems correctly to win a star.

Failures are recorded without raspberries or graphic disintegrations. Lose the game and you see a scowling Acme cab, give a wrong answer to the math question and you get a correction plus a look at the dwindling gas gauge and fare/expense ratio. If you're dissatisfied with your level of play, you may escape to reset the skill levels. I found, for instance, that fifty-five miles-per-hour was too fast for my middle-aged fingers; Acme was there first and I seemed to have more accidents. Afterward, I reset my speed for forty, which is as fast as one should drive on city streets anyway.

When younger players tried the program, they handled the arcade play without problems. They didn't seem to have the difficulty I had in differentiating between my cab and Acme's at a quick glance, before nimbly directing their cabs to the nearest fare. (This is markedly easier in color.) They liked the pictures, the graphic framing of math problems, and the gauges.

The authors have come up with a sound, well-designed educational game for elementary students. The optional onscreen instructions (supplementing the documentation), the prompting directives, and the sequence of choices and messages before and after each game make *Taxi* very easy to use. The alternation of visual-motor quickness with problem-solving prevents tedium and preserves arithmetic as an activity in its own right. Working with math concepts is not a shoot-'em-up proposition. It involves practical skills which create well-defined consequences, such as the gain or loss of money. As is the case with Milton Bradley's other programs, the company will replace a damaged disk for twenty dollars (plus a dollar for postage).

SUBTRACTION

Microcomputer Workshops
$24.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

Grades: 1-4

Similar in format to *Addition with Carry* by the same company, *Subtraction* takes an educationally sound approach to the concept of subtraction and subtraction with borrowing. It provides an excellent alternative to the usually dull, repetitive work of learning mathematical operations. It targets grades one through four, but easily suits grades one through six because of its flexibility.

Subtraction allows you to determine the size of problems to tackle, from one to five digits, and whether or not they involve borrowing. The cursor locates the position of the next entry. You enter "B" if you need to borrow, but then you must enter a new value for the digit after borrowing from it. The program immediately flags errors and lets you try again. Another error calls up the correct response. The program creates problems randomly, avoiding boredom. At the end of each problem, it lists the number of errors you made. The program also rewards you, giving positive responses and using your name in response to correct answers.

I tested this excellent program on third graders with little comprehension of subtraction. Not only did they understand the concept easily, they used the program successfully. It explained the procedure of subtraction extremely well and made the drill fun. You couldn't ask for much more.

ADDITION MAGICIAN

The Learning Company
$34.95
48K; II+/IIe

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 1-5

Addition Magician contains only one excellent lesson. You see a box of nine numbers. Your task: to draw boxes around the numbers that together add up to a target number. You can change the skill level by adjusting the time you have to complete your boxes. Moreover, you can play against the computer or a friend. If you add by counting on your fingers, this program will help you stop. It also helps you visualize the components of numbers.

ALIEN ADDITION

DLM
$44.00
48K; II/II+/IIe

Overall Rating	B+	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 1-6

This educational game provides practice in adding numbers from 0 to 9. Spaceships enclosing problems descend from the top of the screen—alien invaders. You respond to the invasion by typing the correct answer in a movable cannon at the bottom of the screen and firing it at the invading ship. If a spaceship reaches the ground before you fire the correct answer at it, the cannon explodes and the game resets and continues. You can raise or lower the answer in the cannon using one of the designated keys. Hits and misses are recorded at the bottom of the screen. At the end of each game, the program displays high, low, and current hits and misses. The options include skill level (1-9), problem range (3, 6, 9), game length (one to five minutes), and keyboard or paddle control. Skill level controls the speed of descent of the ships. Problem range limits the size of single numbers added.

Like all of the Arcademic Skill Builder programs, *Alien Addition* comes with a generous support package of aids and record-keeping sheets. Flashcards provide manual practice in addition problems. In general, the rest of the support materials seem thoughtfully designed and functional. The program's main strengths are its arcade format and the suitability of its purpose to computer instruction (repetition as a key to improvement of addition skills). However, although *Alien Addition* reinforces learning simple addition, the small range of problems limits its usefulness to middle elementary grades and below. As with any program of this sort, success perhaps depends too much on reflex speed and too little on eye-mind coordination. These matters aside, *Alien Addition* is a sensible choice for the elementary school teacher looking for reinforcement for basic math skills.

MATH BLASTER!

Davidson & Associates
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 1-6

Math Blaster! teaches basic mathematics to children in grades one through six. It covers addition, subtraction, multiplication, division, fractions, and decimals. The higher levels might well benefit adults brushing up on their basic math skills.

The program comes with excellent documentation, a program disk, and a data disk. The program disk is copy-protected, but covered by a one-year accidental damage warranty. You can obtain backups for $10 each. You can add your own exercises to the unprotected data disk. The documentation supplies a telephone number for customer support, but I had no need to call.

When you load the program disk, you can view a demonstration or proceed immediately to the main program. You must configure the program each time you boot the disk, entering your name and specifying sound or no sound, one or two disk drives. Then you select the subject you want to tackle and the file, either the one on the data disk or one you have prepared. You can also choose the Math Readiness file, which contains preschool material. Then you can choose the level. A list in the manual tells you which grade the material in each level best suits. Each level contains four exercises. Look and Learn displays problems for four seconds each. You can increase or decrease the display time and choose to see the problems in a vertical, horizontal, or mixed format. Build Your Skill presents the same problems. You supply the answers and the program times you and displays your score. Challenge Yourself shows the problems with parts missing. You have two chances to get the answer right before the program supplies it. You see your score at the end, at which time you can choose to re-try the problems you missed. Math Blaster is your prize for working through the other three exercises. It is a very well-designed and fast action arcade game with excellent graphics. You try to shoot the man out of the circus cannon to hit the correct answer before a ball tossed into the air falls to the bottom of the screen. You can play with either a keyboard or joystick at one of five speeds.

One of the nicest features of *Math Blaster!* is the Editor. You can create your own list of problems by entering the Editor function while the program loads. Following the clear instructions in the manual, I had no trouble designing my own files, which I saved onto the data disk.

I thought *Math Blaster!* well conceived and designed, with solid educational value and good programming. The team of Davidson and Eckert, professional educator and professional programmer, has achieved polished execution of a good idea. I have only a few minor complaints. The price seems a tad steep and the files a bit difficult to access for younger students (you must type in the whole file name rather than just a single letter). Otherwise, I found it a good program, well suited to both home and school use.

MATH MAZE

DesignWare
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 1-6

To assuage our guilt as we buy more maze games, we parents and teachers keep telling ourselves that maze games improve eye-hand coordination even though we know that this skill is pretty well consolidated in seven and eight year old children. *Math Maze* comes to our rescue. It's a maze game children will love, a math drill parents will love, and a creative program whose varied options suit an incredibly wide range of skill levels, which teachers will love. In brief, your fly must wend his way through a maze, stopping at the amount of numbers which correctly answer the stimulus problem. However, that's like describing the Mona Lisa as a picture of a lady.

You can vary the game tremendously with such options as:

1. Skill Level—fly; fly chased by spider; fly alone with invisible walls; fly, spider, and invisible walls
2. Math Level—addition, subtraction, multiplication, or division with choices ranging from 0 + 0 to 12 X 12
3. Maze Design—choose one of forty on the disk, alter those available, or design your own

All this comes with your choice of black or white background color, sound or no sound, and joystick or keyboard control. Hold on, there's more good news. *Math Maze* is superb in terms of program design and operation. In the first place, you can't crash it. Press the space bar instead of the requested Return and it just

waits for you. Hit Return before you mean to and a simple Escape will rescue you. In the second place, with this program "user-friendliness" takes on new meaning. While the manual is instructive, you really don't need it. The program takes your hand and leads you, clearly and easily, through all the steps. Finally, the format usually calls for a Return, so young children still shaky in reading can set up the game after minimal instruction. On an educational level, the program tells you if you make a mathematical error and presents the problem again until you get it right. It also keeps score. While you get more points for giving the right answer quickly, you always get at least ten points for any right answer.

The create-a-maze option fosters creativity. Put *Math Maze* in a classroom: each child can design his or her own maze no matter how simple or involved; children can practice simple math functions; whiz kids can get extra practice and tackle the challenge of a maze such as "Diagonals." Put it in your home: six year old Bobby can practice addition; ten year old Susie can work on division; forty year old Dad can practice controlling his frustration when up against the maze "Impossible?"

In short, *Math Maze* is excellent. (Does it really say "Thank you" when you choose an option, or am I imagining things?)

MONKEYMATH

Artworx
$24.95
48K; II/II+/IIe/IIc

Overall Rating	B	C	*Reliability*
Ease of Use	B-	C	*Error Handling*
Documentation	D	B+	*Value for Money*

Grades: 1-6

This educational math game deals with elementary counting, addition, subtraction, multiplication, division, or a mixture. At the beginning the program asks you which type of math problems you want to tackle and on which of the three levels. After completing each game you can change to another level or unit.

A constant stream of numbers travel along a conveyor belt across the upper half of the screen. A monkey standing over the conveyor can move right or left within a limited range and earns bananas after answering five problems correctly. He eats these bananas during his lunch and supper periods, thereby earning extra points. As numbers drop out of a hopper onto a separate conveyor belt, they form into simple problems missing one of the necessary digits. The monkey must correctly identify the correct answer and bash it down to the problem below. Another monkey standing below the problem knocks incorrect numbers out of position. If the first monkey (controlled by you, of course) chooses correctly, the problem goes off the screen to the sound of music. A running score appears at the top of the screen, as does the high score of previous games. This helps keep your interest up as you try to beat the previous high score.

Originally written for the Atari and Commodore 64 computers, the game now runs on the Apple also. Unfortunately, the manual still fits all systems, which makes it rather difficult to understand how to handle it on the particular system you have. However, you need not refer again to the one page of instructions once you understand them.

I noted only one problem: starting up. The program asks if you want sound with the game. The program looks only for the N key for No, so any other key signals a yes. Once you accept the sound, you cannot turn it off without rebooting and going through that routine again. Other than that, younger children generally enjoyed the game. The graphics and sound routines held their interest while they practiced basic math. Best of all, this nicely done package offers a ninety day guarantee as well as a generous replacement plan for any disk damaged after that.

SPACE MATH

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 1-6

Space Math turns a group of one to six players into Moonbase Commanders. Your mission: to protect Earth from the attacking Zorlyns. To stop an invader, you must first answer an arithmetic problem. If the computer responds with "Right," you get a chance to shoot down a Zorlyn spaceship as it zigzags across the screen. Using a joystick or the keyboard, you move an "X" to intercept the invader and press the space bar to destroy it. A successful round results in points for the Commanders. All players must perform well to defeat the invaders. When the game ends, it displays individual scores and grades.

You can pose addition, subtraction, multiplication,

or division problems. Teacher Utilities allow you to vary the level of difficulty to meet the needs of your class. You control the number of rounds in the game, the operations tested, and the size of numbers used in problems. You can specify addition with or without carrying, and subtraction with or without borrowing. You can also set various game parameters, such as ship speed. Because student scores are automatically stored on the disk, you can recall them at any time. For diagnostic purposes, scores for addition, subtraction, multiplication, and division are listed separately.

Space Math has nearly every feature you could hope for in an arithmetic drill program. The game is fun and the available options add flexibility to enhance its educational value. I need to cite only a few flaws. First, some teachers and parents may hesitate to introduce yet another computer game in which you blast the enemy out of the sky. Second, the arithmetic problems have no relevance to the game, except that you must solve them to get to the fun. The program may reinforce the impression that math is boring. Finally, Learning Well furnishes no backup disk and its replacement policies could be more liberal.

DEMOLITION DIVISION

DLM
$44.00
48K; II/II+/IIe/IIc

Overall Rating	A-	B+	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	A-	*Value for Money*

Grades: 2-6

In *Demolition Division*, a vertical line of five tanks advances two spaces at a time. Each carries a division problem, stops, and fires at your artillery positions. A thin, brick wall protects each position, but a third shot destroys the wall and your artillery. Using a joystick, paddle, or the keyboard, you aim an answer at a tank and fire. Each miss advances one of the tanks; each hit destroys the tank, but another takes its place at the starting point. After you lose three emplacements or your time runs out, the score displays hits, misses, high and low games, making it possible to set up competition between players.

With little reading or instruction, you can begin at a preset level of difficulty. Changing the options (which tend to be preset toward a higher level of difficulty) requires adult intervention or more extensive reading, although the program resembles others in the Arcademic series. You can adjust the speed to one of nine levels, the time to one to five minutes, and the problem range from one to three, six, or nine. You cannot turn off the sound, but it is not loud enough to annoy others. Given the options, *Demolition Division* best suits children from grade three through six, or as a remedial tool for junior high students. The thorough teacher's manual, flash cards, worksheets, and progress reports support its use in the classroom.

The graphics play well on either a monochrome or color monitor, showing a sharpness of line and realism of movement unusual in educational games. High misses fall behind advancing tanks, while low misses fall in front—a nice touch that helps students work toward the right answer, as does stepped raising and lowering of the answer. Older players can use the program as an arcade-style drill; I found the higher speeds quite challenging. In numerous tests, the game froze only once (in the joystick mode), but reset promptly.

DRAGON MIX

DLM
$44.00
48K; II/II+/IIe

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B	*Value for Money*

Grades: 2-6

For a change, the monster defends the city instead of attacking it. In *Dragon Mix*, a fierce dragon with a long, lolling tongue shoots "fire" (answers to math problems) at approaching spaceships, each containing a division or multiplication problem. If you shoot the answer shown in the dragon at the wrong problem (out of three), the ships move closer to the city. In six steps the ship fires a ray that disintegrates one-third of the city. When the attackers succeed in destroying the entire city, the game resets.

Learning to play the game is quite easy. The program does not include instructions, but you only need to know that you can choose the Fire button from among two keys (one for each hand), the space bar, or the fire button on a paddle or joystick. The latter responds faster, which can be a major factor in this game. You can change or terminate the game at any point, setting the speed of the attacking ships and the dragon's tongue, the problem range, the size of the numbers (from one to three, six, or nine), and the run time of the game (from one to five minutes). You cannot turn off the sound, but the noise is mild compared to normal

arcade effects.

The graphics create a colorful display unusual in an educational game. The dynamics on a monochrome screen intrigued my four year old child, who does not understand arithmetic. Unfortunately, a complicated visual display dictates a simpler game in the inevitable trade-off. *Dragon Mix* lacks the control and intensity of some of the other Arcademic math games, which also offer a simpler fire option (with a set answer) using a paddle or joystick. Of course, they also offer only one type of math problem, whether addition, subtraction, multiplication, or division. This game reinforces quick recognition and the matching of answer with problem, along with timing. Timing can become difficult as the ships get closer, because the tongue looks like it's pointing at one ship rather than the one it really is pointing at.

A display of game hits and misses, as well as the high and low hits and misses, make it possible for you to compete against yourself or others. Flashcards duplicating each problem, worksheets, progress charts, reports, and the manual (helpful in adjusting for different skill levels) help a parent or teacher integrate the game into a math program.

When I called, I found that the toll-free number had been disconnected. However, if you remember to keep the keyboard in capital letters, you should not encounter any problems that the documentation has not anticipated. DLM will replace defective disks at no cost for up to six months from the date of purchase.

MATH STRATEGY

Behavioral Engineering
$34.95
48K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 2-6

Math Strategy is based on a teaching technique called Neurolinguistic Programming (NLP), which includes some of the elements of training based on right/left brain studies. This program does not teach math skills, but is designed to help students develop and use the "most important skills of a good mathematician ... storage and recognition of correct equations and formulas." Storage and memory tasks are best done when the student has a clear mental picture.

Behavioral Engineering feels that there is a connection between mechanical eye movements and memory. People trying to visualize things are known to shift their eyes to the left or right (depending on handedness). Current research indicates that this is an example of the mind using either the right or left brain for creative or logical tasks. This program emphasizes teaching you how to shift your eyes to help store and recognize mathematical concepts. In fact, in the preferred computer setup, the monitor is placed to the extreme right or left.

A picture of a pair of eyes appears on the screen during exercises and tests to remind you of the correct eye position. You look at a simple equation, try to visualize it by an appropriate eye shift, and then type the equation first forward, then backward (to assure that you're actually seeing it in your "mind's eye"). A section of the program explains the background of the NLP technique, and an authoring system allows you to create individualized lessons. The program is well documented and easy to use.

Math Strategy is designed for children, but may be used by adults. It is not a tutorial in that it does not teach math principles. This technique may be extremely frustrating for children or adults who have learning disabilities (such as reversing numbers), but seems to provide good training in visualization for the average child or adult.

MATH LESSON DISK I and MATH LESSON DISK II

Behavioral Engineering
$24.95 (each)
48K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 2-6

Each of these disks is an elementary module for use with Behavioral Engineering's *Math Strategy* or *Math Gallery*. Disk I contains twelve subtraction lessons and twelve addition lessons. Disk II has twelve multiplication lessons and twelve division lessons.

The lessons are not intended to tutor math or improve computational skills, but are a continuation of the lessons in *Math Strategy*, which uses visualization as a means of memorizing and recognizing basic equations. For a complete explanation of how the system works, see the review of *Math Strategy*.

As in the master program, each lesson disk presents a practice period followed by multiple choice or fill-in tests to see if the student is developing the visualization

skills. During these tests, the student looks at equations then types them in, forward and backward. The time limit allowed for input is very short, but scores improve with practice. Again, this program is not recommended for students with learning disabilities in math or reading.

TRAP-A-ZOID

DesignWare
$39.95
48K; II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	C+	C	*Value for Money*

Grades: 2-9

A Hi-Res, animated capture game, *Trap-A-Zoid* provides a gentle introduction to, or reinforcement of, basic geometrical shapes. Using the keyboard or a joystick, one or two players must catch a wiggling, Shmoo-like Zoid as it makes its way across a 12 by 14 dot grid. Your trap consists of a prescribed geometrical shape (square, triangle, polygon, etc.) which you must quickly draw around the dancing figure before it reaches the far side of the grid. The right margin of the screen contains a scoreboard as well as a Zoid pen where you keep the captured aliens. At the bottom appears a listing of the shapes required from you at the various levels of play.

The mechanics of drawing involve placing the cursor and pressing the space bar to connect the grid dots with a line. The joystick/button combination does the same thing, but much faster. You can correct mistakes by retracing your steps.

Trap-A-Zoid offers five levels of difficulty, beginning with simple shapes and progressing through the various types of triangles, rectangles, quadrilaterals, and polygons. You must capture Zoids by drawing a certain number of forms on each plateau. The difficulty increases at higher game levels as well as when you increase the Zoids' speed from sluggish, to casual, to zippy. One of the Main Menu options lets you change the game setting, creating bonus questions and SuperZoids in levels three through five. You know you have a SuperZoid on your hands when the regular creature within your trap escapes, utters an electronic laugh, and runs for the right grid border. When this happens, you must quickly answer the displayed bonus questions before the SuperZoid reaches the border and steals back his points. The SuperZoids add zest to the game and the bonus points contribute to more competitive play.

One important menu choice provides a geometrical dictionary to which you can refer at any time while maintaining your current game status and score. In fact, if a Zoid escapes more than seven times on any level, a message appears reminding you that you can interrupt the game for a brief course in basic geometry.

Overall, I thought this teaching game for younger students a fairly entertaining drill, helpful in augmenting classroom work. Along with the on-screen dictionary, the program also contains a comprehensive demonstration. The documentation is adequate. The clear graphics ensure that you don't confuse a scalene and an isosceles triangle, for example, and the sound effects are as lively as those in any shoot-'em-up.

MATHEMATICS Grade 3

Queue Intellectual Software
$79.95
48K; II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 3

Mathematics Grade 3 is a four-disk package presenting a variety of math problems appropriate for third grade and older students. It includes modules on addition, subtraction, multiplication, and division, as well as dollars and half-dollars, how to use dollar signs, comparing fractions, and measuring with a ruler. Students are given instruction in counting money and using a thermometer. They also learn how to use calendars, studying the sequence of months of the year and many other things.

Each disk has ten programs with a total of 600 questions to provide practice for the student. As in *Mathematics Word Problems Grades 1 and 2* (see separate review), problems are presented in a series of related concepts. However, a few of the concepts are expressed differently than in some text books. Teachers should view the programs first in order to warn the students of these differences.

Questions are either multiple-choice or fill-in-the-blank. If the student answers incorrectly, he is given the correct answer and an explanation. This allows each student to proceed at his own pace. If a student has a good understanding of a concept and therefore needs no explanations, he can move quickly through the chosen module. It normally takes fifteen to twenty

minutes to complete a module.

This program may be purchased with or without the classroom management system. This system automatically records students' names, scores, modules completed, and percentage correct. But since it only holds up to ten files at one time, the teacher will have to clear some or all files periodically. You can print out this information for a permanent record.

Intellectual Software provides a toll free number if you need information or assistance. Damaged disks are replaced for a $3.00 fee.

NUMBER STUMPER

The Learning Company
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 3+

Number Stumper teaches six- to ten-year-olds that any one number equals more than just one combination of numbers (for example, six equals three plus three, or four plus two, or seven minus 1). The game consists of four progressively more difficult versions. Two involve adding numbers together to form another number, one involves subtraction, and the last involves both addition and subtraction. The method they use requires some explanation. One or two dice roll across the screen to a sound not unlike tap dancing. The numbers 0 through 9 appear at the top of the screen. You must match the total on the dice with two or more numbers having the same total (adding or subtracting as required by that version). This gets harder as the game progresses, because each number can be used only once. It becomes more difficult with each successive roll of the dice to make the numbers add up (or subtract) in accordance with the number on the face of the dice. This method forces you to think about the subject rather than answering questions automatically—an excellent learning tool.

1, 2, 3 DIGIT MULTIPLICATION

Microcomputer Workshops
$24.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 3-6

This well prepared program provides drill and practice in multiplication of three-digit numbers by a one-, two-, or three-digit number. You determine the size of the multiplier for the randomly chosen problems. The cursor locates the position of the next entry. The program immediately flags errors, letting you correct them and helping you understand where and why you made a mistake. The carry always appears, including a zero if you don't need one. To use the program for self-directed study, you must be able to read well (grades three and up, but the program targets grades two through six). Random choice prevents memorization and superior rewards greet correct answers. The straightforward sample problems preceding the actual drill allow you to proceed with a clear understanding of the concept presented.

1, 2, 3 Digit Multiplication will benefit everyone who uses it. You can easily understand the explanations if you can read and easily remember the concepts after finishing. I thought it well implemented and a good supplement for elementary classroom work in multiplication.

FRACTIONS

Peachtree Software
$49.00
48K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A-	B+	*Value for Money*

Grades: 4-6

This program replaces *Eduware Fractions 3.0*, which, in turn, replaced *Compu-Math Fractions*. Although it is quite similar to its predecessor, it has been improved in some respects. The remaining weaknesses seem minor when compared to what *Fractions* accomplishes.

The student begins with a pre-test, goes through a particular unit (with exercises and tests), and takes a comprehensive post-test. The units include work on the

definitions of the parts of a fraction, finding common denominators, as well as addition, subtraction, multiplication, and division with fractions. The student can choose to enter any unit or test and, up to a point, escape a particular unit to the main menu or use the left arrow key to return to a previous screen. If the student does not do well on the unit exercises, the program repeats all or part of the unit.

The teacher or parent can modify the program through an extensive "Learning Manager." You can enter the student's name, turn the sound on or off, arrange the order of units, or omit some of them. You can change how many tries the student is allowed before the correct answer is given, change the passing percentage in unit tests, increase the number of problems in a given test, or omit some unit tests altogether. You also may view or print unit scores and percentages.

The units and screens are quite well designed. Goals for each unit are stated at the outset. Screens are titled, subtitled, and numbered. On the left, instructions are boxed; on the right, a work space displays examples, exercises, answer choices, and, sometimes, an animated figure. Input registers automatically or requires hitting the Return key; screens advance with either the space bar or the right arrow key (prompted). You could look at these last two items either as inconsistencies, or variations designed to keep the student alert.

Some of the flaws of earlier versions have been corrected. More care has been taken to mandate using the lowest common denominator (LCD) in answers. To inculcate the habit of reducing answers to the LCD, the program always asks for it, even when the answer is already in that form, and always shows a denominator, even when the answer is a whole number. For example, it expects 49/7 to be reduced to 7 0/7. Again, you can view these as quirks of an overzealous programmer or hindrances to learning. Certainly, students should be forewarned of these expectations.

The program could use some other improvements. Too often the text sections use the same (or almost the same) fractions within a problem or two of their first use. Correct multiple-choice answers tend to be the same numbered option two or three times in a row. Finally, it would increase the usefulness of the program if advanced learners could go right to a pre- or post-test on a particular unit (say multiplication), without having to solve problems of addition and subtraction.

Despite all of these weaknesses, however, *Fractions* sets the standard in its subject area for what a clear, graphically attractive tutoring/testing program should be.

BUMBLE PLOT

The Learning Company
$39.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

Grades: 5-7

Bumble Plot represents a refreshing approach to reinforcing mathematical skills via computer. The single disk contains five educational games in order of increasing challenge. They turn the process of identifying and plotting points in Cartesian coordinates into a fun experience. Ordinarily, students learn such mathematical material on the upper elementary or intermediate school level, so *Bumble Plot* should appeal particularly to junior high school students learning the principles of graphing in two dimensions.

Nicely written, graphically illustrated documentation accompanies the package, but you can use this menu-driven program quite easily without consulting it. The main menu employs large, easy-to-read type. You have the option of turning the sound on or off. The menu lists five games: Trap and Guess, Bumblebug, Hidden Treasure, Bumble Art, and Roadblock. I shall describe them briefly, along with their educational merits.

Trap and Guess tests one or two players' ability to guess an integer number (in the range -3 to +3) randomly selected by the computer. You do this by trapping the number between others, eventually homing in on the correct answer as you tighten your traps. Although simplistic in concept, this game develops skill in using positive and negative numbers, an understanding of their locations along a number line, and reasoning skills in arriving at the final prediction.

Bumblebug draws a grid of lines from -2 to +2 and locates an "X" (the Bumblebug) on one of the points where two lines cross. You move a small square (the trap) to the point you expect the Bumblebug to hop to next. If you guessed right, you trap the Bumblebug and win; otherwise you keep trying. Here you learn the use of positive and negative numbers in two dimensions and develop spatial awareness by plotting points on a four-quadrant grid.

Hidden Treasure extends the spatial awareness and reasoning skills developed in Bumblebug by adding the concept of standard number pair notation (X,Y) and the notion of greater than or less than with respect to positive and negative numbers. You play the game by looking for randomly located undersea treasures occurring at points where the lines of a grid intersect. The grid extends in two directions, from -5 to +5. The

computer responds to an incorrect answer with word clues that prompt you to raise or lower the X and Y coordinates of the point guessed.

Bumble Art is simply a "connect the dot" method of drawing geometric shapes of figures. You can draw your own picture by naming your own dot coordinates, placing them on a 20 by 20 grid, or you can choose one of Bumble's favorite pictures. In the latter case, the computer supplies the dot coordinates. Again, this game reinforces all of the skills acquired previously, plus the ability to transfer an original graphic idea to a two-dimensional coordinate system.

Last, but by no means least, comes Roadblock, a cops and robbers game in which you try to surround the robber by moving Xs (roadblocks) into strategic positions on a grid. You have to think quickly because the robber moves around the grid and you have a fixed time limit in which to surround him. This game adds the element of time, which requires thorough familiarity with the Cartesian coordinate system.

You can play all of the games on a black and white monitor, but they are much more effective on a color screen. The high-resolution graphics, though not as sophisticated as those used in other educational software of the same type, are nevertheless quite well done and more than sufficiently detailed for the purpose. Keyboard errors are readily handled by a return to the Main Menu. After thorough testing, the program appears to have no obvious flaws; it performs smoothly and swiftly.

Bumble Plot won the Learning Magazine Software of the Year award and the Parent's Choice Software of the Year award. In my opinion, it well deserves these accolades.

MINUS MISSION

DLM
$44.00
48K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	B+	A-	*Value for Money*

Grades: 3-7

Green slime covers the top of your screen and drips large blobs onto your double-barreled laser with all the relentlessness (and sound effects) of space invaders. You've got from five to fifty-five seconds to choose the correct answer to the subtraction problem enclosed in the blob, and fire, before the lowest one reduces you to a cloud of dust. Fire the wrong answer and the target blob moves one level lower. Disintegrate the blob with the correct answer and you get a nice explosion (sound and image), a hit recorded, and another blob of slime starting its descent. The best you can do is keep the slime at a safe distance until the game resets twice. At that point you can admire your score (hits and misses) and compare it to the high and low scores for a given session. You can also change a number of factors now (or at any time in the middle of the game), adjusting speed of descent (Skill Level), the range of problem numbers (0-3, 0-6, 0-9), the total run-time per game (one to five minutes), and whether or not to use a paddle or joystick. You cannot silence the sound effects, but they are not loud enough to disrupt a classroom.

Choosing paddle or joystick over the keyboard options involves more than a preference for speedy movement and the ability to hold position—the game gets somewhat simpler. You need not both select an answer and move into position to fire; you simply move the given answer to the appropriate spot and fire it, whereupon another answer replaces it. This option best suits the novice or more elementary player.

In my experience, the keyboard option, which enables you to pick off the lower blobs first in an orderly march across the bottom, results in higher scores. The keyboard option has three configurations which you can mix to set up two different choice situations. Left and right key arrangements allow movement left or right, a stepped increase or decrease in the answer shown in the laser, and fire. A more sophisticated two-handed configuration includes arrow keys to control movement, numeric keys to control the answer, and the space bar to fire. This last calls for some thumb dexterity or hand movement, but results in higher scores. Actually, a mix of the two configurations might work best: control movement and firing with the left or right configurations, while the other hand controls the numbers.

You must learn the play and program options from the documentation because the disk has no initial instructions. Typical of the Arcademic series, *Minus Mission* comes with a manual, worksheets, and flashcards for the teacher or parent who wants to make this game part of a learning program. Particularly useful are the instructions on how to chart progress, which helps you adjust the difficulty of the game enough to make it challenging without making it impossible to win. Since the problems involve one-digit numbers, the game teaches only quick recognition and dexterity to students past elementary arithmetic.

ARITH-MAGIC

Quality Educational Designs (QED)
$35.00
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B-	B+	*Value for Money*

Grades: 3-8

Arith-Magic is a set of three math games designed to sharpen skills in grade levels two through nine. This program is designed for classroom use, and the teacher's solutions to the problems are included in the documentation.

The first game, "Diffy," tests subtraction for grades two through six. The student selects four numbers at the corners of a square, then finds the differences, which in turn become the corners of the next square. The objective is to find four original numbers which will require as many moves as possible to reduce to zero, so that the process continues until the number in each corner is zero.

The second game, "Tripuz," sharpens either Addition/Subtraction or Multiplication/Division skills, and is designed for grades two through six. The computer chooses three numbers between 1 and 9 which form the vertices of a triangle. These numbers are not revealed to the student, but are represented on-screen as question marks. The sums, or products (whichever are specified), of the hidden numbers are revealed between the vertices, and the student must discover the hidden numbers. The teacher's solution is derived algebraically.

"Magic Squares" is designed for grades five through nine, and is the most challenging of the set. It leads the student to an intuitive understanding of averages and arithmetic sequences. The student is shown a square of nine numbers, 1 through 9, whose every row, column, and diagonal adds up to 15:

2	7	6
9	5	1
4	3	8

The student is then asked to solve for a missing number in more difficult Magic Squares. The final object is to complete a Magic Square given only three of its elements.

Arith-Magic is not copy-protected, though the user is asked to copy the diskette for use on one computer only. The program is menu-driven, and uses single-key input commands. Documentation is sparse, but adequate, except for its explanation of the teacher's solution for "Magic Squares" (which omits instructions). Overall, this is a fairly stimulating educational tool for the elementary grade levels specified.

METEOR MULTIPLICATION

DLM
$44.00
48K; II/II+/IIe

Overall Rating	B+	A-	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	B	B-	*Value for Money*

Grades: 3-8

Meteor Multiplication joins DLM's other educational games in the Arcademics Skill Builders series. It employs an arcade game format of alien invaders to provide practice in the multiplication of numbers from one to nine. You can adjust the problem range for multipliers up to three, six, or nine; the skill level by the speed of the invading ships, through a range of nine speeds; and the length of the game, from one to five minutes. The eight invading ships each contain a multiplication problem. You type the correct answer in the mothership at the center of the screen, then fire the answer at the invader closing in from the perimeter. If you shoot down all eight ships before they reach the mothership, the screen resets until the set time elapses. If an alien ship reaches and destroys the mothership, the screen resets up to two times until the game ends. During the game, hits and misses appear at the bottom of the screen; afterward, they appear on a summary screen along with current, low, and high scores.

One of the best programs in the DLM series, at a high skill level *Meteor Multiplication* provides a challenging exercise even for older students. Of course, it does so more from demands on the student's speed and coordination rather than intellect. This limitation belongs to math games in general, however. Without a calculation pad, the awkwardness of typing numeric answers affects the success of the player. *Meteor Multiplication* offers the various Control key options of all the Arcademic series; the only speed keys (especially for two-column answers) are the number row keys with the left-right arrow (to rotate the mothership's gun) and the space bar (to fire). You can use the paddle option, but I hardly consider it desirable. Color enhancement adds somewhat to the visual display.

The fair support package includes multiplication flash cards, masters for student record and progress charts, and practice worksheets. A teacher's manual suggests strategies to help students improve their multiplication skills. Despite their usefulness, these additions are not an essential component of the package. The program amply demonstrates its ability to provide students with effective multiplication practice while holding their interest.

BUZZ BANG HARVEY

Queue Intellectual Software
$29.95
48K; II

Overall Rating	B-	B-	*Reliability*
Ease of Use	B	C+	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 4 and up

Buzz Bang Harvey is an educational game that covers counting, multiplication, and division. With seven levels, the age range is wide: from fourth grade up to adult. You can even set the built-in timer for the amount of grace time—anywhere from one to sixty seconds—if you believe that will help you out when you've lost track of just what's going on!

When I first opened up this attractively packaged software, I was really uncertain of just what I was getting into. The folder-type container held the one disk and a few sheets of simple instructions. It's enough, though, to demonstrate that the vendor is interested in protecting your investment. Upon booting up the disk, you sit back and view introductions of what lies ahead in this counting game. You're given a choice of which of seven levels to start with, and then...on with the game.

The seven levels range from easy to nearly-impossible. The first basically involves simple counting and recalling whether a number contains a 5 or a 7, or is divisible by either one of those numbers. (For example, the number 35 not only has a 5 in it, but it's divisible by both 5 and 7.) The program starts counting for you, and the lowest number (in this case, the 5) would be the correct answer. Five is called "Bang," and you choose it by pressing the Y key. Counting continues from there. If you press the wrong key (even the "5" key, which would be a natural response), you will elicit a frown from passers-by and the counting goes back to number one. After the counting reaches 50, the level is automatically advanced and more conditions are added.

At level seven—known as "Super Harvey"—things get really heavy. Every time a word is flashed, the invisible player Harvey moves one position counterclockwise. Since you cannot see him, you have to keep up with all the mental gymnastics of Bizz (contains/divisible by 3), Bang (contains/is divisible by 5), and Buzz (contains/is divisible by 7), as well as whatever numbers were not flashed. A fine kettle of fish! Thank goodness, this version of the program doesn't include the option that reversed directions whenever a word was shown. As is, I'm still trying to figure out an easy way to win.

Even though the upper levels get more difficult, I found them both interesting and educational. The lower levels are easily geared to any student who has a solid command of basic multiplication and division facts. A "Hall of Fame" board keeps track of all the top scores and names so you can continue to motivate and encourage the player to improve his skills. If you want, there's even an option to erase the "Hall of Fame," bringing it back to a clean-slate condition. This is particularly useful if you're trying to instill a feeling of accomplishment in a new or young player.

Although *Buzz Bang Harvey* is fairly basic, some minor problems do crop up that may prove disastrous. The program's error checking is incomplete and at times the deadly Syntax Error rears its ugly head and bombs out the program—but only if you do not press the correct keys when requested. As a software reviewer, I do make a habit of pressing keys other than those that are asked for, just to see what happens. For example, pressing a lowercase instead of an uppercase letter will cause your correct answer to be counted as incorrect. It may seem a minor problem, but young students don't always do what they're supposed to, and this restriction may get in the way.

Overall, I really did enjoy learning while playing with this program. I should mention that the graphics are very basic and seemed to show up best on a monochrome monitor. The white of the graphics on a color screen is a bit too strong, particularly with a limited amount of color presented in the graphics. The levels are easy enough at the low end, and extremely difficult at the high—giving you a wide range of skill levels and fostering an intense desire to win. Now, if I can only find a way to expose Harvey for all to see!

ORDER OF OPERATIONS

Microcomputer Workshops
$29.95
48K; II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	B-	B-	*Error Handling*
Documentation	B-	B-	*Value for Money*

Grades: 4-10

A good skill builder, *Order of Operations* gives you step-by-step practice in simplifying numerical expressions of the four basic mathematical operations, using both positive and negative numbers. Random selection of problems adds to the variety, as does the inclusion of one multiplication or division operation and one addition or subtraction operation in each problem. Categorizing operations helps you get through the step-by-

step process, as does showing the summary of steps at the end of each problem.

This program seems best suited for children in grades six, seven, and eight, but when two children aged twelve and fourteen worked on the program, they said they found it much easier to figure out the answers in their heads. They didn't want to bother with the computer program, or even write the answers with pencil and paper. I, too, felt frustrated, probably for the same reason. Nonetheless, I have only one suggestion: enhance the program with graphics.

FRACTIONS

Edu-Ware
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A-	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A-	B-	*Value for Money*

Grades: 3-6

Edu-Ware Fractions 3.0 is a graphically-enhanced version of the previously released *Compu-Math Fractions*. The problem in reading fractions formed from inverse blank spaces has been overcome by the use of a very readable set of characters and figures in a shape-table. The use of color is minimal, and not vital to the working of the programs, so that it is quite possible to use black and white monitors for this package.

There is an extensive, well-prepared Learning Manager Master Menu which is designed for the teacher/parent to set up the package and present it to the student/child. It is possible to pre-program the units to be tested (definitions and parts of the fraction, denominators, addition of fractions, subtraction of fractions, multiplication of fractions, and division of fractions). Administration of a pre-test or post-test can be chosen, as can the number of questions in each unit. Sound effects can be "on" or "off" for answer entry and correction feedback. The number of incorrect responses for a practice problem before being taken back to review the material can be pre-planned. There are other very desirable controls available as well.

A previous review pointed out a very serious flaw in the earlier package. Namely, in using the common denominators formed by multiplying all of the denominators together rather than using the lowest (least) common denominator. This has not been completely corrected. If anything, there are some additional shortcomings introduced in the current version. On parts of the package, determining the reduced form of the answer is encouraged, in fact demanded—even when the answer was already in that form. The use of zero as a numerator when the result of the problem was a whole number answer is also questionable.

In addition to the inconsistent attempt at simplifying techniques, there are serious problems with the way user-responses are accepted by the program. In an attempt to control input, fields have been established on the screen. This would be a valid approach if there was a way of controlling the length of those fields as determined by the question. For example, if the field length is set for three digits, and the correct response was 100, then upon pressing 1, 0, and 0, the program would automatically continue; but if the correct response is 9, the user would have to press the space bar twice before the program would accept the answer and continue. To compound this difficulty, some parts of the package do not accept input without pressing return.

What is probably most annoying is the realization that this package could have almost been an ideal tool to use in the classroom and in the home. To this reviewer, the shortcomings could have been overcome by more care in coding. The use of random problem generation is the chief culprit in producing these bizarre results. Admittedly, the program would be longer, and repetitive, but some topics require absolute control—fractions is obviously one of those topics.

ARITHMETIC

Locus Systems
$29.95
48K; II/II+/IIe

Overall Rating	D	C	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	B	D	*Value for Money*

Grades: 4-7

The documentation describes *Arithmetic* as a drill and practice program to help students solidify their arithmetic skills. You can practice addition, subtraction, multiplication, and division of positive or negative whole or decimal numbers. A Main Menu screen lets you choose drill or practice. Teachers can change the program by pressing the Escape key when the program displays the Main Menu. You can change the number size for any operation, the operations allowed, the number of attempts allowed, the points allowed, the number of problems, and the decimal factor. The easy to follow documentation makes entering changes simple even for computer novices. An onscreen and hard copy score sheet provides a system for keeping records.

Although the documentation makes the program sound good, I though it a poor example of classroom drill and practice software. For example, a number size ranging from 1 to 100,000,000 sounds great, but limitations crop up when you actually run the program. You must program a number space for that range, so "4+5= " appears on the screen with large spaces between numbers, making it difficult to visualize the alignment of columns of numbers. It seems inappropriate to arrange numbers horizontally if you want to ask problems involving numbers in the hundreds, thousands, and millions. Students cannot add, subtract, multiply, or divide these problems in their heads—they need work space on the screen to properly position columns of numbers. Conversely, if you just want to drill on math facts, all you need is a two-character slot for each number.

Worst of all, the program lacks creativity and the ability to motivate children. For example, when you choose sound, a "bell" denotes a wrong answer. This is neither friendly nor good educational strategy. Alternatively, a smiling face rewards correct answers—but the face remains monotonously the same for each correct answer. In addition, the timer loop takes so long that any student would stop paying attention before the next problem appeared. Further problems crop up in response to wrong answers. The instructions do not tell you to wait until the wrong answer has been cleared, so if you correct the answer too quickly, the program credits you with another incorrect response.

Given all these problems, teachers should look for a better computer drill and practice program or stick to the tried and true flashcard method.

LONG DIVISION

Microcomputer Workshops
$24.95
48K; II+/IIe/IIc

Overall Rating	A-	A-	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

Grades: 4-8

This excellent program possesses the advantages of random problems and optional use of one, two, or three digits in the divisor. This means that students who are ready for two-or three-digit divisors ahead of their classmates can challenge their skills while the others work at their own speed. You solve each problem step-by-step as if on paper, which makes the program a valuable learning experience. Cursor movement leads you into the next step, which helps you remember the sequence of steps (especially confusing with two-digit divisors). The directions, although understandable, nonetheless require teacher reinforcement when introducing the program.

Since *Long Division* immediately flags errors, you can't continue to make them. You could work the same problems on paper incorrectly and not realize your mistakes unless the teacher caught them, but the computer spots them immediately. You don't even have time to get discouraged, because the program gives you the answers after the second attempt. The positive remarks after each problem encourage you to continue. In fact, my only suggestion for improvement would be to add eye-catching graphics to reward students for correct answers.

BASES OTHER THAN TEN

Queue Intellectual Software
$29.95
48K; II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B+	*Value for Money*

Grades: 7-9

This highly interactive tutorial provides practice with number systems that use bases other than ten. It can be used as an introduction or a review for students in grades seven through nine and is meant for independent instruction.

Systems covered include base two, base five, base twelve, and base sixteen. The program gives explanations of these number systems, and provides practice in converting numbers back and forth. Using symbols for digits is introduced. Mathematical computations such as addition, subtraction, multiplication, and division of non-decimal numbers are also practiced. There are eight modules of instruction and quizzes and two comprehensive test modules.

Testing techniques include the usual multiple-choice and fill-in-the-blank questions, but also cloze technique. Here a student is presented with a paragraph with certain words blanked out. He must type in the correct words. With each of these techniques, if a student enters a wrong answer, he is given the correct answer and an explanation. Thus, each student can proceed at his own pace. Students who have mastered a concept and need no extra explanations can move quickly to the next problem.

At the end of each module, the student is given his score, including number of questions attempted, number

right, and percentage of number right. Students' scores and modules completed are automatically saved in the management portion of the disk. Classroom teachers can view these results on the monitor or print a hardcopy for a permanent record. The only drawback is that the program only holds ten names at a time, so for a large class, the teacher will have to clear these files frequently.

Intellectual Software maintains a toll free number if you need assistance, and damaged disks are replaced for a $3.00 fee.

FAST FACTS

Edu-Soft
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: 5-7

This neat package provides timed practice in the four mathematical operations, with attractive, oversized, and easy to read Hi-Res fonts. At the end of each round you get to try the problems you missed. If you repeat the same kind of problem, you retain your best score from round to round. You can kill the sound for classroom use. The documentation, although sparse, is adequate and well written. Five different formats contribute to variety:

- Beginner Fast Facts, timed at a relatively slow pace, suits basic practice.
- Solo Fast Facts has the timer running at a faster rate. It presents ten problems in each round. Perhaps you can get a perfect score, but I couldn't do it because the speed of response is a big factor, even with all the right answers.
- Team Fast Facts allows two to five players to play as a team in amassing a total score. It keeps track of each person's name and prompts each one at his or her turn.
- Competition Fast Facts allows two to five players to compete against each other in a race against the clock. It keeps track of individual scores and prompts you by name.
- Marathon Fast Facts demands speed as you race through 100 problems. As the instruction booklet says, "There's no time to count on your fingers!"

Each of the five options allows you to select problems in addition, subtraction, multiplication, division, or a combination of them all. There are no options for levels of difficulty. The problems run the gamut from 1+1 to 13 x 13. Because the time factor forces you to calculate all problems in your head, mastering the programs offers a real challenge. It's definitely not a beginner's disk, despite the dismaying introductory comments that imply otherwise. Don't be misled—there's plenty of meat here for serious students.

You can copy this disk for backup and buy a schoolwide license for all computers on site or a hard disk for only $35 (EduSoft also provides five sets of documentation). The company replaces defective disks free for ninety days and for $5 after that. *Fast Facts* is as good an advanced arithmetic practice disk as I've seen.

LANTERN OF D'GAMMA

Milliken Publishing Company
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	C	*Value for Money*

Grades: 5-7

Lantern of D'Gamma is a math-oriented hi-res adventure in which you enter a castle, find the Lantern of D'Gamma, determine who stole the king's diary, find the hidden diary and map, and locate a buried treasure.

The game puzzles are relatively few, but some are very tough and illogical. Most involve squares, square roots, and various number bases. The answer sheet packaged with the documentation can take all the suspense out of the game, but it could be essential for frustrated students.

Figuring out who stole the diary is an exercise in logic based on a number of notes that you find lying about (if your lantern is lit). The graphics (except for a considerable gray area that you must traverse) are well done in this thirty-one location game. The game suffers, almost terminally, from the lack of a save-game capability, especially as it is relatively easy to get killed. Forcing students to finish it in one sitting doesn't seem appropriate for classroom use.

The documentation includes thirty-two reproducible study aids and an activities booklet for teachers. As a game, it isn't bad, but it's not great either. As a math tutor, it's quite good.

ADDING FRACTIONS

Microcomputer Workshops
$24.95
48K; II+/IIe/IIc

Overall Rating	B+	A-	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	A-	A-	*Value for Money*

Grades: 5-8

Adding Fractions benefits *advanced* upper elementary school students. Despite the excellent format, the extra multiplication step required would confuse most students. Because most of the fractions do not already have a lowest common denominator (LCD), you have to find it yourself. For example, to add 1/6 and 1/9, you must multiply each fraction by another fraction to get two fractions with a common denominator. In this case, you would multiply 1/6 by 3/3 and 1/9 by 2/2 to get 3/18 and 2/18. Now you can add the fractions. Students at the elementary level need a great deal of direction from the teacher to use this program. You can also choose one or two methods explaining how to find the least common denominator if you have trouble. The Multiple Chart on the disk helps you find the LCD fairly easily, and offers continued help.

After entering the LCD, you convert each fraction to a form that contains the LCD. Now you can add the fractions. The program has the advantages of generating problems randomly and giving you two chances to find the answer. If your second answer is incorrect, *Adding Fractions* explains the correct answer—very much to your benefit. You then have the choice of trying another problem or leaving the program. At the end of the problem, you see the number of errors you have made. The program flags such errors as: using a common denominator not the same as the lowest common denominator, trying to add before the denominators equal, adding the denominators, etc.

Dividing the screen into two parts helps you realize the different steps involved in solving the problem. The cursor aids you, too. Moreover, the program explains the format well, plus the concept of reducing the fractions to their lowest terms or changing them to mixed numbers.

A final note: I think this program could use some graphics as a reward after successful completion of a problem, and to enhance understanding of the concept of adding fractions, especially given the level of maturity of children at the elementary level.

DECIMALS: ADDITION AND SUBTRACTION

CBS Software
$24.95
48K; II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	C-	C	*Error Handling*
Documentation	B	C	*Value for Money*

Grades: 5-8

Another offering in the *Success with Math* series, *Decimals: Addition and Subtraction* reviews carrying and borrowing for grades five to eight. More importantly, it gives extensive practice in lining up decimal points.

In the Adding Decimals lesson you select the desired level of difficulty and the program generates a problem. The numbers to add appear in a single horizontal row. You must rearrange the numbers so that the decimals line up vertically. Once you've done this, you can proceed with the addition. The program guides you via a cursor that shows where to enter each new digit until you obtain the answer. You must show all numbers carried. The lesson Subtracting Decimals has a similar design, methodically leading you through all the steps, including borrowing if necessary.

This program has some shortcomings. Its several menus, title pages, and elaborate instructions test your patience. Onscreen instructions are sometimes vague, such as "S=Stop with evaluation." More importantly, the horizontal display at the start of a problem adds nothing of educational value and requires awkward use of the keyboard to position the numbers. Simpler keyboard commands would test your decimal line-up skill just as effectively. One final problem: the program's insistence that you show all carrying and borrowing. Bright students should have the option of doing these steps mentally. CBS claims that the *Success with Math* series has been classroom tested, but this package causes me to have some doubts.

DECIMALS: MULTIPLICATION AND DIVISION

CBS Software
$24.95
48K; II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	B	*Value for Money*

Grades: 5-8

This offering in the *Success with Math* series covers multiplication and division of decimal numbers for grades five to eight. It reviews multiplication and long division and, more importantly, introduces the subject of decimal point placement.

In the lesson Multiplying Decimals, you first decide on the level of difficulty. The program then randomly generates a problem for you to solve. A cursor in the problem shows where you should add each new digit as you progress through the step-by-step solution. You must also enter numbers to be carried. As a final step, you position the cursor to place the decimal in the answer. The lesson Dividing Decimals uses the same general approach. You move the decimals in the divisor and dividend as a preliminary step, after which the actual process of long division begins. Again, the program methodically monitors every step.

As with the other programs in the series, this one detects and corrects every error the moment you make it. Clearly, the *Success in Math* programs offer more than the usual drill and practice common in educational software. Another attractive feature is the analysis of errors displayed at the end of each problem and again at the end of each lesson. I wish, however, that you could save this record on disk. Such a facility would make the program more valuable to teachers.

DIVIDING FRACTIONS

Microcomputer Workshops
$24.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 5-8

This drill and practice program specifically targets children in grades five through eight. It provides practice in dividing fractions, particularly the concepts of reciprocal fractions and reduction of fractions before multiplying them. The program begins with a tutorial example problem that includes directions on how to operate the program. You can decide how many of the randomly-generated problems you want to do.

The screen layout includes a problem area, a work area, and an instructions and message area. You work through the problem on the screen and then see the answers inserted into the work area problem. Feedback encourages correct responses and directs you to correct wrong answers. At the conclusion of the practice session, the program gives a summary of results. This is not permanently recorded on disk, so if you want to keep a record of student progress you should prepare a record sheet.

Dividing Fractions offers an excellent example of solid drill and practice. You see the problem work on the screen and then work it yourself according to the steps of the algorithm and help you practice it as well as computation. The addition of concept reinforcement to computation makes a noteworthy improvement of drill and practice software.

The program does not employ any phony gimmicks (like hissing dragons or blasting rockets) to encourage learning these needed skills. It delivers what it claims to deliver—good drill and practice for students who need to reinforce a concept and hone their computation skills. The clear documentation gives you permission to copy the manual for distribution to students. You can also copy and list the program, which means that you can see how to formulate other drill and practice programs of this caliber. *Dividing Fractions* is a worthwhile purchase.

ELEMENTARY CLASSROOM LEARNING SYSTEM—WHOLE NUMBERS

Sterling Swift Publishing Company
$495.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 5-8

Elementary Mathematics System—Whole Numbers supplements the math curriculum for intermediate grades or helps remedial math students at the junior high school level. It consists of six disks, plus a manual explaining instructions for use, content, and the background of each unit.

The Classroom Management disk, the core of the system, enables the teacher to enter individual students in the program. First, however, you must enter the students' names in a group. You can modify or delete group lists and individual names and call up all information on the students either to the screen or to be printed out. The programs on this disk also let you override the pre-test and study plans on the student disks. The disk is menu-driven so that even a novice can use the system. A single set of disks maintains records for five groups of up to forty students each.

There are four student disks: Addition, Subtraction, Multiplication, and Division. Each disk contains pre-tests, tutorials, drills, and mastery checks. The student receives frequent performance evaluations, with excellent graphics and encouraging remarks. The system contains twenty-two units (five or six lessons on each disk) which coordinate well with most math curricula. A complete outline of each lesson appears in the documentation, along with the lessons'objectives and sequence.

For students to use the disks, they must enter their names, group numbers, and a password (available to the teacher through the Management disk). This facilitates individual record-keeping and student privacy.

While error-trapping is generally good, if a student assigned a specific lesson number inadvertently types that number plus Return (instead of only) Return after the lesson appears on the screen, the system will "crash," and the student must reenter the information from the beginning.

The Games disk consists of two games: Slam Dunk for one player and Space War Math for two players. Slam Dunk reinforces lessons and may be used from the beginning. After choosing the topic (addition, subtraction, multiplication, or division), the student answers timed problems shown on the screen. If he answers correctly, a little man throws a basketball into the basket, scoring points. If he answers incorrectly, the ball misses the basket and no points are scored. After a series of problems, the screen displays the number of "dunks" and the score and rates the player from "beginner" or "rookie" (low score) to the title "All Star." Missed problems repeat during the course of play.

Space War Math is designed to follow mastery of each unit and requires game paddles. A competitive game, it requires a player to complete a problem to gain one point. Identical problems appear before both players. The first player to correctly answer three problems wins.

Although well-planned and for classroom use, the price of the initial system is high. Further copies are available at the reduced price of $295.00.

FRACTIONS: ADDITION AND SUBTRACTION

CBS Software
$24.95
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 5-8

Part of the *Success with Math* series from CBS Software, *Fractions: Addition and Subtraction* targets grades five to eight. Since the denominators usually differ, the program stresses skill in converting to least common denominators.

In the lesson Adding Fractions, the program generates two fractions and offers you the following options: (1) Change to least common denominator; (2) Add; or (3) Reduce. Typically, you must choose the first option and derive the least common denominator in a prescribed step-by-step fashion with generous prompting from the program as needed. Next you select the second option and determine the sum. If you can reduce the sum or convert it to a mixed form, the third option provides a routine for doing so. Throughout the problem solving, the program identifies process errors as soon as they occur and helps you correct them. The lesson Subtracting Fractions uses the same format, but with an added feature: it gives you mixed fractions to subtract. This means that you may have to borrow from the whole number as a preliminary step.

Perhaps the only shortcoming worth mentioning is that the lessons permit no shortcuts. Bright students will soon become impatient with the many tedious steps required to derive the least common denominator. The program should include a provision allowing you to enter an answer immediately without intermediate steps.

This package is definitely well done. As with other programs in the *Success with Math* series, the tutorial method fosters a stepwise, disciplined approach to problem solving. The program coaches you when you encounter difficulty, but ultimately, you must enter the correct answer every step of the way and correctly solve each problem. Cautious students can request instructions or a sample problem before attempting a lesson, but most will jump into the exercises immediately.

FRACTIONS: MULTIPLICATION AND DIVISION

CBS Software
$24.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	A-	*Value for Money*

Grades: 5-8

Part of the *Success with Math* series from CBS Software, *Fractions: Multiplication and Division* targets grades five to eight, emphasizing the skill of reducing terms prior to actual computation.

In the lesson Multiplying Fractions, the program first randomly generates two fractions. Like a private tutor, it then prompts you every step of the way until you have correctly multiplied the fractions. The top of the screen shows the original problem, kept on display for reference; the center, the work area, displays each entry you make; and the bottom, the message area, allows you to communicate with the program. The message area offers two options: (1) Cancel or reduce and (2) Multiply. If you can simplify the problem by reduction, you choose the first option and direct the computer in performing the reduction. Then you proceed with multiplication. The program asks for the numerator product, then the denominator product. If the final answer exceeds one, you must write it as a mixed fraction.

The lesson Dividing Fractions resembles the first lesson, but with an added option: Reciprocate divisor. You must always select this as a first step. With either lesson, once you've solved the problem the program displays a tally of errors in two categories: procedural and computational. Thus, you receive immediate feedback plus a record you can try to beat on the next problem.

Fractions: Multiplication and Division has some noteworthy features. As explained, it functions as a tutor, not an electronic page turner. If you proceed sensibly through the problem, you are praised at the conclusion. If you falter, the program offers words of advice (such as "3 and 4 will not cancel") or words of encouragement (such as "Keep working, you'll get it"). The program employs a solid teaching method without resorting to whistles and bells to generate interest. The authors apparently believe that success in learning is its own best reward. I found only one fault with the program: it displays an informative error tally at the end of each lesson, but doesn't save the tally to disk. Saving the tally would benefit any teacher who's too busy to look over every student's shoulder at each lesson's end.

This package is my personal favorite among the *Success with Math* programs. It gets the student quickly into the subject matter with a few clear instructions that create no unneccesary obstacles to problem solving. A bright student can skip the instructions and examples and go directly to a lesson. I highly recommend *Fractions: Multiplication and Division* as a first purchase for anyone wanting to sample CBS math software.

MULTIPLYING FRACTIONS

Microcomputer Workshops
$24.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 6-8

Multiplying Fractions is an excellent program for students in grades six, seven, and eight. With teacher direction, it provides rewarding practice and facilitates the understanding of the process of reducing fractions. Although explicit, the directions probably still require teacher orientation of students in grade six and possibly grade seven.

Dividing the screen into three areas definitely benefits students. You can compare your progress in the work area to the original problem. You receive immediate feedback after an error (essential) and can immediately make corrections (also essential). Errors flagged include such things as trying to reduce diagonally or vertically, trying to reduce two numbers whose GFC equals one, and trying to multiply before completing all cancelling or reducing. Cursor movement leads you into the next step. The random generation of problems definitely has advantages, especially since it guarantees different problems each time you run the program. The program may include problems that don't require cancelling, but I couldn't find one among the many problems I worked. It might add to the program's interest level to include a few such problems. I would also add some meaningful graphics to heighten the interest level. Children anticipate rewards for successful completion of problems.

SUBTRACTING MIXED FRACTIONS

Microcomputer Workshops
$24.95
48K; II/II+/IIe/IIc

Overall Rating	C+	B-	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	B-	*Value for Money*

Grades: 5-8

This user-friendly math program shows proper subtraction of mixed fractions for grades five through eight, but people of any age could use it as a refresher. *Subtracting Mixed Fractions* displays two randomly generated fractions with a denominator of nine or less. You must then find the LCD (lowest common denominator). If you have problems arriving at the proper answer, the program responds first with a hint, then leads you through the necessary steps. After you have determined the LCD, you proceed with the remainder of the problem. You must change each fraction so that both LCDs are equal, multiplying each side of the fraction until both have the same denominator. (The program leads you through these steps.) You then get the choice of subtracting them or, if necessary, borrowing from the whole number. Throughout each step, the program flags and explains all errors as they occur. When you complete the problem, the screen displays the number of errors made and the number of problems completed. The program then asks you if you would like to continue with another problem. No provision exists for turning it over to another student—you must re-run the program for the next student.

The program's manual describes the steps necessary to properly complete each problem and the program begins with an explanation describing each step for the student. You need the manual only as an overview because of the program tutorial included in the introduction.

This user-friendly program asks for your name at the beginning and directs some of its remarks to you. Unfortunately, the entire program consists of text with no graphics or sound; younger students had a hard time concentrating on the problems and didn't seem very interested in continuing.

INTEGERS & INTEGER FAST FACTS

Edu-Soft
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 6-9

This drill and practice program for signed integers renders the text and numbers in Hi-Res graphics with one of the cleanest and most attractive fonts I've seen. The package includes two programs.

Integers offers drills in addition, subtraction, multiplication, and division of positive and negative numbers. It also provides some tutorial help. Multiplication and division rules await your summons and appear automatically when you make a mistake. If you make a mistake on a subtraction problem, the program shows you how to change the problem from subtraction to addition with a change of signs. A number line on call helps you visualize and solve a problem graphically.

Integer Fast Facts offers three different game formats: solo, team, and competition. A clock starts counting down from 100 at the outset, making it virtually impossible to get a score of 100% even if you get all the right answers. Also, the program accepts your entries directly from the keyboard without Return. This means that you cannot change your mind or correct an accidental keypress. The computer immediately registers an error and displays the correct answer.

All things considered, these programs perform well. After proper instruction, the drills could help you polish your skills with positive and negative numbers. They suit students from about the sixth grade and up. Edu-Soft permits you to make one backup copy and provides free replacements of defective disks for ninety days, with a charge of $5 after that. Schools can obtain a site license for $35.

ALGEBRA: Volumes One through Six

Edu-Ware

$39.95 each (vols. 1-4); $49.95 each (vols. 5 and 6)

48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 7 and up

Albegra helps students who wish to increase their knowledge of the fundamentals of algebra. It consists of six programs that start with number theory and proceed through arithmetic operators, elementary equations, graphing, roots and powers, and quadratic equations. These are only the major categories; *Algebra* contains much more than I could hope to list here.

While these programs do form a series, each volume may be used by itself and is sold separately (except volumes Five and Six, which are combined). For example, in Volume One the organization first presents an index in flowchart form and is color coded to tell you which item comes next and whether an item has been attempted, satisfactorily completed, or needs more work. This volume includes five learning units: Definitions, Number Line Operations, Sets, Evaluating Expressions, and Rules for Reducing Equations. Each learning unit includes concepts. Unit One has four: Numerals, Operators, Grouping Symbols, and Equality. Now comes the best part: the system offers you four ways to study each concept and, of course, in the order you choose. The first learning mode, definition and discussion, briefly explains the concept. Next come rules or axioms with examples following. Finally, sample problems show you the program's solutions and then you can try your hand at it. At the end of every unit and each volume comes a test to reveal your strong and weak points. At the end of Volume Six is a comprehensive test for the whole series. This one gives you a printout of your performance (the only place that the printer is used in the program).

Algebra is a good program: complete, logically presented, and readily understandable. While not aimed at a particular age group, I would guess that students in the seventh grade and above would have no difficulty in using the program and that younger students could start on it with some coaching. The ability to choose the subject and proceed at your own pace provides a big plus. I find this an effective way to learn, for if you don't get it the first time, you can always have another go. On the minus side, the color coding of the index—although a nice touch—is useless except on a color monitor. The sample problems, although good, could be more challenging. Too simple a problem makes it easy to guess rather than actually practice the technique. On top of that, I really miss immediate feedback after doing the sample problems. As it is, you must wait until the unit test before finding out how well you did and whether you need more work on a specific technique. All in all, *Algebra* provides a good introduction to the fascinating world of mathematics and a good review for those of us who need it.

METRIC SYSTEM TUTOR

Cygnus

$66.00

48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 8-12

At last, a good, easy to use, entertaining way to learn the metric system. As stated in the manual, the program aims to: 1) provide exciting, individualized instruction in science and math; 2) develop the interrelationship between science and math; 3) develop a working knowledge of the metric system; and 4) convey the thrill of learning. I think the program succeeds fairly well in all these areas.

You can either go through the program step-by-step, take a placement test to determine which areas you should study, or immediately take the final exam. There are summary quizzes within each section to test your comprehension. Depending on your score, you can either repeat that section or move on to the next. The program does not deal with conversions between English and metric units.

The program probably best suits students from sixth grade through high school. The tutorial and final exam include both very large and very small units, which tend to distract from the basic simplicity of the metric system and could confuse remedial students or those using the metric system for the first time. In all other respects, *Metric System Tutor* offers a delightful experience for both students and teachers.

MATHEMATICS FOR SCIENCE

Merlan Scientific Ltd.
$217.00
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B-	A-	*Value for Money*

Grades: 7 and up

This award-winning program is an ambitious series of tutorials designed to teach measurement (scale reading, including linear and vernier scales), math techniques (significant digits and rules for adding, subtracting, and rounding off), exponential notation (what it is and the arithmetic rules used with it), and a miscellaneous category dealing with metric conversion and slope. Such mathematical skills are appropriate for students from junior high school through adult.

The program embodies advanced educational principles: adequate learner control; random generation of problems; appropriate use of computer graphics, sound, and text; and error handling routines that rank among the best I've seen. The program diagnoses your responses and suggests further tutorial work or quizzes, or provides explanations of concepts which offer particular difficulty. You can switch off the sound at your discretion, thus allowing the program's use even in the most crowded classroom.

The program does not provide any teacher utilities for tracking student progress or producing records. Yet this lack does not limit the program as much as it would some, because the intended students will most likely be mature enough to record their own activities.

Educators concerned about the absence of high quality courseware can take heart from these programs. The *Mathematics for Science* series indicates that such courseware is both possible and available.

EQUATIONS II

Microcomputer Workshops Courseware
$29.95
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 7-9

Equations II is a new offering in the extensive collection of mathematics software from Microcomputer Workshops Courseware. As with other programs in the series, this one focuses on a single topic from the standard mathematics curriculum. The subject matter here is linear equations of the form $AX + B = CX + D$. The equations must be solved for X, which always turns out to be an integer. The program provides both tutoring and practice, and accomplishes its objectives extremely well.

Offering more than mere drills, the program takes the student step-by-step through the problem-solving procedure until the correct answer is obtained. After typing in your name and deciding how many problems you want to solve, the program displays your first equation (perhaps $3X + 5 = 8X - 10$). You then must select the appropriate operation to perform from a list of five choices: 1) add the same term to both sides, 2) subtract the same term from both sides, 3) multiply both sides by the same term, 4) divide both sides by the same term, or 5) simplify both sides. The program accepts any choice, provided it leads to the solution of the equation. Let's say you choose to add a term to both sides. The program asks what term you want to add and then enters your response to both sides of the equation. You next simplify the expression by performing the actual addition. In this fashion, the pathway to the solution develops. If you incorrectly answer any question posed by the program, you get a second chance. Another wrong response results in the program's supplying the correct response. Thus, no problem remains unsolved.

At the end of each problem, you get a tally of the errors you committed categorized according to whether the mistake was procedural or computational in nature. You can quit the exercise at any time and request a total error analysis showing how many problems you finished and the number of errors. You may ask for a hard copy of the analysis; in a classroom setting, these sheets can be submitted to the teacher.

I tested *Equations II* on an exceptionally bright prealgebra student who had just recently learned the skills it requires. Frankly, he found the program boring and griped because he couldn't skip steps and simply enter the answer. Beginning students and slow learners, of course, should not be allowed to skip steps. The program is best suited for this group of students; once they become bored, the lessons have accomplished their purpose. For fast learners, you can improve the program by adding a provision for skipping directly to the answer or by making problems progressively more difficult.

Equations II has many features one should expect in educational software. It is non-threatening, interactive, and diagnostic; the program supplies immediate, positive feedback, and produces tangible results. On the negative side, it has no graphics or game-like qualities; I doubt any student will describe it glowingly as "fun." I

recommend *Equations II* to any teacher who is searching for a new way to reinforce a critical math skill that every student must master.

ESTIMATION SKILL BUILDERS

Edu-Soft
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	C	*Value for Money*

Grades: 7-12

Estimation skills help you find quick approximations of the results of arithmetic problems. *Estimation Skill Builders* provides drill in estimating the results of your choice of functions: addition, subtraction, multiplication, division, or a combination of all four. You can select from three levels of difficulty ranging from beginner to expert. The format allows you twenty-five seconds to enter your answer, then a figure tosses a dart at a bullseye. The program determines your score according to the speed of your answer and whether it falls within plus or minus 30%, 20%, or 10% of the answer, or matches it exactly. Each round consists of ten problems, playable by one or two people.

Nothing on the disk or in the two pages of documentation instructs you on estimation techniques. As it stands, the program is largely a guessing game. I'm not sure of the target level, but it is definitely not elementary school students. The level of difficulty varies considerably, jumping from single digit problems to five digits and more. Teachers may find a use for the program in the classroom as a drill to accompany formal instruction in methods of estimation. Edu-Soft offers a school-site license for a very reasonable $35, which allows you to make a copy of the program for each computer or hard disk and provides you with five sets of documentation.

BINOMIAL MULTIPLICATION

Microcomputer Workshops
$29.95
48K; II+/IIe/IIc

Overall Rating	A-	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: 8-11

This program gives high school students practice in multiplying binomial functions using the FOIL method. The program contains instructions, a tutorial on the FOIL method, and randomly-generated problems. The documentation is brief but concise. The problems section provides a work space on the screen where you enter the terms. When higher order terms appear, the computer automatically places the proper exponent. If you give the wrong answer, the program prompts you to try again. A second error calls up the correct answer. At the end of each problem, the program gives you an error analysis showing the number of errors in multiplying terms and in combining like terms. At the end of a set of problems, you get a total error summary.

While it deals with only one type of problem, this well-done and easily-used program possesses much educational value.

EQUATIONS

Microcomputer Workshops
$29.95
48K; II+/IIe/IIc

Overall Rating	A-	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: 8-11

Equations gives students practice in solving linear equations with one unknown, of the form ax + b = c. It targets students just learning to solve this type of problem or those who need remedial work. The problem appears at the top of the screen, above a procedures menu. You select a procedure which the program implements. It simplifies the result and you continue until you have found the unknown. *Equations* explains both procedural and computational errors as they occur. A summary of errors appears after you have solved the problem.

While brief, the concise documentation proves sufficient for operating the program if you're generally

familiar with the subject. It does not teach the uninitiated. The documentation also lacks information on copy protection, networking, or warranty replacement of the disk.

GRAPHING LINEAR FUNCTIONS

Microcomputer Workshops
$29.95
48K; II+/IIe/IIc

Overall Rating	A-	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: 8-11

This program gives high school students practice in graphing randomly-generated linear functions on a Cartesian coordinate system. You can choose from easier problems of the type y = mx + b, or harder problems of other types, or mixed problems. The program then presents a work area and a choice of procedures to reduce the problem to its simplest form. Each procedure requires you to carry out the necessary computations. Once you have reduced the equation to its simplest form, you must choose three values of x and compute three corresponding values of y. Once you have found these values, you plot the coordinates on the x-y axes the program displays. If you encounter difficulty in plotting the equation, you can call up a beeping tone as an aid. As the cursor moves closer to the proper location, the beeper's pitch rises. If you still have trouble, the program displays the proper point. When you have plotted all of the points, the program plots a straight line through them.

This easily-used, well-planned, and well-implemented program proceeds in clear, simple, well-presented steps. It allows practice in graphing with a minimum of assistance from the teacher. Unfortunately, the concise documentation offers no information on copy protection, networking, or a warranty.

SOLVING QUADRATIC EQUATIONS

Microcomputer Workshops
$24.95
48K; II+/IIe/IIc

Overall Rating	A-	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: 8-11

This program gives high school students practice in solving quadratic equations by factoring. It generates random quadratic equations, requiring you to choose one of three approaches to factor the problem and determine the roots. If you make a mistake, the program tells you why the answer is wrong and gives you a second chance. If you give a wrong answer the program will branch to a tutorial section that explains the correct procedure. *Solving Quadratic Equations* provides a work area on the screen where you watch each step of the problem and see the entire solution. After each problem, you get a summary of errors divided into procedural and computational errors.

This well-designed program provides good practice in factoring quadratic equations, space to view the work, and excellent error feedback and remedial study. Unfortunately, the concise documentation offers no information on copy protection or warranty replacement of the disk.

ALGEBRA WORD PROBLEMS

Queue Intellectual Software
$49.95
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 9

Algebra Word Problems is one of five disks in Intellectual Software's Practical Algebra Series. The series offers tutorials on beginning algebra skills common to freshman high school courses.

After booting the disk and entering your name, the program presents you with a choice of ten lessons. Lesson titles include Getting Started, Two Steps, Multiple Steps, and Two Unknowns. Using a multiple-choice format, the program guides you through word problems on the particular algebra skill selected. First,

a problem is stated. Then the tutor asks you to select (from a list) the correct equation for solving the problem. Next, you must show that you know how the equation is used. Finally, you are asked to enter the proper numerical answer. Anytime you give an incorrect response, the program generously provides helpful hints. After a hint, it encourages you to try again. When you decide to quit the lesson, pressing Escape causes the program to display your score for the work just completed.

The package's Management System is a handy feature. The teacher enters a secret code to access the student performance files. Each student's file consists of a table showing lessons attempted, the number of questions completed in each lesson, the percent of correct responses and a notation showing if more work is needed.

I suspect *Algebra Word Problems* will be more popular with teachers than students. The Management System is particularly appealing, as is Intellectual Software's toll free phone number and its generous disk replacement policy. Students may find lessons dull and repetitious, and creative teachers may have to provide motivation and spark interest. The other packages in the practical Algebra Series are Symbols and Sets, Real Number Systems, Equations I and Equations II. None of the programs goes beyond quadratic equations and all use the same tutorial style.

FACTORING ALGEBRAIC EXPRESSIONS

Microcomputer Workshops
$29.95
48K; II/II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B	C+	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 9-12

This user-friendly program, made especially for math students in the ninth through twelfth grades, offers an enjoyable experience from the start. Although not easy, the material covered no longer presents an impossible task. *Factoring Algebraic Expressions* explains five of the hardest steps in algebra in detail.

The Main Menu gives you the choice of: easier quadratic trinomials, harder quadratic trinomials, difference of two squares, common factor, and mixed problems. You choose how many of each type of problem. Directly below the problem lies your work area. The computer not only gives you space to do your figuring, it helps you when you ask it to. Some of the options include (H)elp, (S)ee solution, and (Q)uit. Help calls the exact result of your entry to the screen, letting you guess without penalty as long as you don't hit the Return key. See solution takes you step-by-step through the problem, showing you what to do in each step. You then return to the problem to try again, without penalty. If you answered the problem but not exactly right, the program directs your attention to that section. When you answer correctly, the program congratulates you, shows you what errors you made, and continues. If you wish to exit from the program at any time, touching the Q key drops you out and displays your scores.

This program offers a learning experience, not just a test to see what you know. You can easily understand the concise instructions at the front of the program and move on to learn not only how but why you should work the problems one way rather than another. *Factoring Algebraic Expressions* shows the effort that went into its production to make it as enjoyable and educational as possible.

GRAPHING EQUATIONS

Conduit
$60.00
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B-	A	*Value for Money*

Grades: 9-12

Graphing Equations is one of the best educational packages available for high school students today. The four programs on the disk deal with graphing mathematical equations and they span the content of high school courses in algebra, trigonometry, and analytic geometry. The easier programs cover linear and quadratic equations; the others include square roots, exponents, logarithms, and trigonometric functions. All use Hi-Res graphics exclusively.

"Linear and Quadratic Graphs" displays a graph on an X-Y coordinate grid. You must write the equation that matches it. After you have entered an equation, the program graphs it on the same coordinates using a different color. A good match yields a "Right" or "Close enough" message, while a poor match gets "Try again." The program's ability to judge answers impressed me. Suppose the given graph is Y = X. The program would judge any of the following answers correct: Y - X = 0, X + 3 - Y = 3, or 2X + 4 = 2(Y + 2). You can

choose the level of difficulty. If you get stuck, you can ask for the correct answer—but you won't advance to a higher level if you do.

"Green Globs" displays the coordinate grid with thirteen globs randomly located. You must enter equations for graphs that will hit the globs. As the program plots the equations, each glob hit pops like a balloon. Your score appears after each equation. An outstanding score requires only a few equations. In the Novice Game you can use any kind of function except trigonometric ones, which would hit every glob with a single equation such as Y = 10 SIN(10). The Expert Game permits trigonometric functions with the catch that five "shot absorbers" scattered around the grid stop any shot that hits them. After the game, the program invites you to enter your name in the Hall of Fame if your score ranks among the top ten ever played on your particular disk. The Hall of Fame list becomes part of the disk's record and can be recalled at any time. Better still, the ten top games are stored in complete form so that you can study the techniques used and better your score—or challenge someone else's score.

In "Tracker" you attempt to uncover a linear or quadratic graph hidden on the coordinate grid. Any equation that you enter acts as a probe. If the probe hits the hidden graph at some point, an "X" appears. After you have made enough hits, you can enter a "tracker" equation. You win if the tracker matches the hidden graph or approaches it closely. The object is to use as few probes and trackers as possible. The top ten scores remain on the disk.

"Equation Plotter" is a utility program that graphs quadratic or other equations. You enter an equation and choose the scale of the axes, then the program makes the graph. You can enter equations in a variety of forms, but general functions must appear in a form giving one variable as a function of the other. Once the program has generated a graph, you can change the scaling of the axes.

This package has only one fault worth mentioning: neither the programs nor the documentation adequately instruct the student on entering difficult equations. Applesoft BASIC allows you to express virtually all functions encountered in mathematics, but you must know some particulars. For example, you can always use parentheses to show which operations to perform first, but in the absence of parentheses the computer follows its own priorities, performing multiplication and division before addition and subtraction. Students with little experience on computers need to know the existence and meaning of such functions as EXP, ATN, and SQR, as well as the use of — to enter an exponent and LOG(X) to represent the natural, not the common, log.

Some unexpected delights of this package merit mention. First, the equations that you type appear on the screen as they would in a textbook, not as programmers write them. In some cases you don't even have to use the proper Applesoft BASIC form (such as XY instead of X*Y). If you type something silly, like #, when entering an equation, the program simply ignores it. You can easily edit out other errors in the usual fashion. If you have entered an equation improperly, the program often understands what you did wrong and offers a hint, such as "Use parentheses around function argument." Although the programs have no provisions for printing hard copies of your graphs, you can accomplish this by booting a graphics dump program once you have the desired graph onscreen. Finally, the speed with which the programs load is very nice—no long waits here.

Two professors from the University of Illinois authored this program under the sponsorship of the National Science Foundation. *Graphing Equations* is a credit to its creators and to Conduit for marketing it.

PROJECTILES II

Vernier Software
$24.95
48K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 9-12

Projectiles II puts you at the launch site of a cannon about to shoot at a target some distance away. You must choose a launch speed and angle to direct the projectile to its target, either by trial and error or by applying a good bit of physics. Once you have fired the projectile, its trajectory appears on the Hi-Res screen. You can superimpose several trajectories for comparison. All together, this simulation program offers both instruction and entertainment.

You can choose your experimental parameters: a stationary target or one moving at constant velocity; a launch site atop a 100-meter cliff or one horizontal to the target; air resistance included or omitted, and a wind factor if you choose. Wisdom dictates beginning with the simplest case and building up from there. You can experiment a bit, but the real fun comes in setting up the proper equations beforehand and scoring a "hit" on the first shot.

The twenty-one page manual strengthens the package. It first describes the nine "challenges" presented to students, then explains the two "manual modes" for the

benefit of the teacher. The manual modes nicely suit classroom demonstrations and controlled experiments. The manual then presents the equations needed to predict the projectile path. For some reason, it does not give equations for the effect of air resistance. You must research that on your own. Programming buffs might like to know that the projectile firing program appears on the disk in both normal BASIC and compiled BASIC. You can experiment with both languages and compare their running times. Of course, anyone wanting to LIST and modify the program would choose the BASIC version.

Perhaps the program's only shortcoming is that you cannot record or even measure your performance. For a sense of accomplishment, you need performance objectives, which shouldn't be difficult to devise because the program generates its own interest. Although *Projectiles II* uses no bells or whistles, how refreshing to find educational software that can bring out the excitement inherent in its subject matter.

SIMULTANEOUS LINEAR EQUATIONS

Microcomputer Workshops
$29.95
48K; II/II+/IIe/IIc

Overall Rating	C+	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	C+	*Value for Money*

Grades: 9-12

This algebra program, aimed at students in the ninth through twelfth grades, strives to give students practical experience in solving simultaneous linear equations. Randomly-generated equations mean that no matter how often you run the program, you rarely encounter the same problem twice. Two equations show values of X and Y. You must find the real values of X and Y by making choices among the possibilities offered. Each step follows logically, giving you little chance to get completely lost. When you choose the incorrect step, the program immediately responds with added information to correct you. You then return to the problem for another chance. After you complete the problem correctly, the program proves the correctness of your answers by plugging them into the formulas. After that, it drops into a graphics mode to plot out the coordinates of both equations and prove that you can work out the solutions by graphing, as well.

The program works well—perhaps too well. It lays out each step in such a way that it seems nearly impossible to make any mistake except choosing the wrong option. Students just starting to work with linear equations will get the most from the program because of the instructive rather than frustrating level of the problems. You learn not only how to solve the problem, but also how to check your own work. If you complete a problem correctly, the screen displays words of congratulations. If you made any errors, the screen displays a description of them. When you have completed all of the problems requested, the program gives you a listing of the number of questions answered and the total number of errors for each section.

Unfortunately, the program handles only one student at a time. When you complete your series, you can either continue or exit from the program. Another student cannot start without re-running the program. Of course, this doesn't provide a major problem except for the added delay in loading and running the program. The programmer has obviously worked hard to make it nearly impossible for you to enter bad data, and the error trapping and friendliness make it difficult for even a complete beginner to run into trouble.

TRIANGLES

Queue Intellectual Software
$65.00
48K; II+/IIe/IIc

Overall Rating	C+	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: 10-12

This package is part of Intellectual Software's extensive Practical Geometry Series. It covers triangle terminology, angle and side relationships, types of triangles, the Pythagorean theorem, bisecting, congruency, medians, and altitudes.

Intellectual Software describes the lessons presented in *Triangles* as tutorials. They make extensive use of multiple-choice and fill-in-the-blank questions. The student receives immediate feedback on each answer, and help and encouragement are provided as needed. However, some lessons, such as Triangle Basics, suffer from too much repetition and offer little more than drill-and-practice. They would appeal only to the slow and very patient learner. Other lessons are more creative; Angles on triangles, for example, uses a varied question format and moves quickly to ward off boredom. All lessons feature a conversational style and get high marks for user-friendliness. I cannot imagine a student getting bogged down in any of them. Upon

leaving a lesson, the student automatically receives a progress report, including the percentage of questions correctly answered.

Teachers will appreciate the Management System, a feature accessible only to them. Records for ten students are automatically kept on disk. Each record contains data on number of lessons attempted and scores obtained. The documentation supplied with this package is adequate, but not elaborate. It could better delineate the contents of each lesson, and might suggest supplementary activities for classroom use. Intellectual Software supports its customers well with a toll-free phone number and a $3.00 disk replacement policy. Other packages in the Practical Geometry Series are: Lines and Angles, Circles, Quadrilaterals, Theorems I, and Theorems II. I recommend the series if you are looking for a conservative style of software free of bells, whistles, and other gimmicks.

MATHDISK I, II, AND III

University of Evansville Press
$18.95 ($9.95 workbook)/$18.95 ($9.95 workbook)/
$27.95 ($13.95 workbook)
48K; Apple II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*
			Grades: 11 and up

Mathdisk is a three-part math series intended "to assist mathematical discovery-learning by the use of programs already written and ready to run." In fact, it's a collection of programs for use primarily by two groups: "well-motivated high school students and college students working alone or in small groups; and teachers and teachers-in-training." The programs and the areas that they cover were taken from a series of articles that appeared in *The Mathematics Teacher*, the journal of the National Council of Teachers of Mathematics. I've evaluated all three disks and their accompanying workbooks together as all are very similar in design and execution, only the content varies significantly. Each of three *Mathdisk* disks is sold separately.

Mathdisk I contains forty-three *Applesoft* programs that cover number theory (integers, probability, and random numbers). *Mathdisk II* consists of thirty-six programs dealing with analytic geometry and algebra (functions, graphing, lines, circles, and conic sections). *Mathdisk III* has forty *Applesoft* BASIC programs covering higher math (real roots, complex numbers, complex roots, polynomials, superithmetic, and matrices).

Mathdisk seems well suited to meeting the needs of its designated audience. However, *Mathdisk* is not intended to be a tutorial on mathematical concepts, but rather it allows students who are already somewhat familiar with a topic to explore it in greater depth using the computer. The programs themselves are quite well written and accomplish their tasks. I won't critique each of the 119 programs on these three disks. Suffice it to say that the programs are well documented (both within the textbooks and in the programs themselves), contain various types of graphics where appropriate, and allow for modification.

Knowledge of computer programming isn't required to use *Mathdisk*. Fortunately, however, the programs are listable, so students who know BASIC can revise them. Consequently, both programs and workbooks are ideally suited for use in a computer math/BASIC programming class. The unprotected disk also allows the teacher to place any designated program from the teacher's copy onto a student's disk for assignments. In addition, the backs of the workbooks contain exercises for each program. The workbook also contains a sample run and complete program listings for each program. Short explanations of the major portions of the programs are included.

My only negative remarks are: the explanations given in the workbook (books 1 and 2) for how each of the programs function are a bit too short and would be much more helpful if they had more details (the explanations in workbook 3 are more helpful); and many of the exercises in the backs of the workbooks merely ask the student to run the program and plug in certain values. This section could be vastly improved by making the exercises more challenging (and thus of greater educational value). I don't consider either of these two objections so serious as to negate the program's good features, however.

Even with its problems, I must conclude that *Mathdisk* would be a good investment for an individual seeking to increase his knowledge of certain math principles or trying to understand how the computer can simplify various principles. In addition, the series would be a good investment for teachers of computer math programming. In either case, to get the best value for your money, I strongly recommend that you choose *only* the disk that actually covers the topics that interest you.

KEY-STAT

Oakleaf Systems
$49.95
48K; II+/IIe

Overall Rating	C-	C	*Reliability*
Ease of Use	C+	D	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: 13+

Key-Stat is a good idea poorly executed. This statistics tutor for beginning statistics students offers as menu selections the basic statistical methods that are covered in standard statistics texts. It prompts the student to enter assumptions relating to normalcy of distribution of data and non-parametric text, and applies this information whenever the user indicates non-normalcy. The package is menu-driven throughout, using a mixture of cursor function selection and selection by typing a number. It makes good use of graphics in both menu and statistical displays.

Unfortunately, *Key-Stat* has many significant gaps. Many critical spots lack error trapping. If, for instance, you ask for a data file when none exists, the program enters a loop and you have to re-boot. Data saved for use with one statistical technique cannot be loaded up and run on another; the designers assumed that only one statistical test would be used on each data set. The printer capability only works with "selected" tests, and is not consistently available. Inadvertently hitting the reset key crashes the system and requires a total reboot. If you don't enter data when it is called for, the system snags irretrievably.

A microcomputer-based tutorial makes it easier for students to learn statistics. Certainly eliminating tedious number crunching by hand is bound to be popular with stat students. This package, like most statistical tutorials, assumes some statistical knowledge and is relatively useless to anyone who is completely new to the field. Additional tutorial support in the form of explanations supplied within the program, or even just an accompanying text, would really enhance this package's usefulness.

Overall, *Key-Stat* is a very basic, even crude instrument despite its slick graphics. The statistical tests supplied could as easily have been stored, module by module, and called out one at a time. *Key-Stat* adds a limited amount of tutoring (e.g., when parametric and non-parametric tests are appropriate) but that's about it. There are better packages at the same level which handle data more flexibly, and which are much more extensive and comprehensive in scope.

CALCULUS ON THE APPLE

Sasoco
$39.95
48K: II/IIe

Overall Rating	C	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	D	C	*Value for Money*

Grades: College

When I took calculus a long time ago, we used slide rules to calculate the coordinates to plot on graph paper—one point at a time. It took a longer time to construct a single plot and even longer to make comparisons by changing parameters. *Calculus on the Apple* contains twenty-two utility programs written by Dr. Hans Sagan which plot on the screen the functions you enter. According to a mathematics professor who helped me with this review, the programs best suit a beginning-level college calculus course. To help you judge their usefulness, I have listed the programs as follows:

1. Table
2. Extrema
3. Plot
4. Limit
5. Derivative
6. Sequence
7. Combinations
8. Newton 1
9. Newton 2
10. Rule of False Position
11. Parameterplot
12. Polarplot
13. Space Curves
14. Intersum
15. Trapezoid
16. Simpson 1
17. Simpson 2
18. Simpson 3
19. Series 1
20. Series 2
21. Differential Equations
22. Runge-Kutta

Perhaps what is most important about the disk is that all of the programs work—and work well, at that. They even handle asymptotes with ease. Each program has one or more dummy lines which you replace with your desired functions expressed in conventional BASIC arithmetic notation. You then RUN the program. It prompts you for required input data, limits, and so forth. After a short wait, it displays the results on the screen, plotting the graphs with high resolution graphics. I though the graphs quite good. But in my view,

the program possesses at least two major shortcomings.

First, the disk comes without written documentation. It offers limited instructions for each program, but even my friend the professor didn't quite know what the program expected for certain parameters. At times we had to break the program and examine the program listing (the straightforward BASIC code can be copied and LISTed) to see more clearly what the program expected for input. For more details and documentation of the programs, the author refers you to his publication, *Calculus—Accompanied on the Apple,* available from Reston Publishing Company. The book probably facilitates the use of this disk immeasurably.

Second, you apparently cannot save the graphic screens or print the results of running the programs. Without these options, the programs lack permanence. The graphs and charts are fleeting images, wondrous to behold, but of no value for homework or future reference. You must reenter the data each time you RUN the programs, which greatly detracts from their usefulness. If you just need programs to demonstrate principles of calculus, the disk has some good ones, and it sure beats writing your own.

DESCRIPTIVE STATISTICS

Biosource Software
$49.95
48K; II/II+/IIe/IIc

Overall Rating	D+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C-	*Value for Money*

Grades: 13-16

Descriptive Statistics is designed to supplement textbooks used in introductory statistics courses. The program consists of two tutorial disks and a third disk containing a statistics laboratory.

The tutorials are basically a page of information followed by a one-question quiz. One tutorial covers measures of central tendency; the other measures of variability. Upon completion of each tutorial a ten-question, multiple-choice test may be taken. The test questions are the same as those asked after each page of a tutorial, but placed into a limited test "bank" so that different questions are asked with each retest. Some of the questions are fairly simple; a few require the student to draw inferences.

The statistics laboratory allows you to enter up to twenty three-digit numbers which are "statistically calculated." The data set is then graphed and mean, median, mode, range, and standard deviation are shown. There is nothing more on this disk.

As a device to help grade-conscious students pass multiple-choice tests, *Descriptive Statistics* seems to be adequate. The program is at least more interesting than a set of flash cards. After a couple of retests, students can pretty well memorize the correct answer or at least the placement of that answer in the set of responses. Teachers will like the fact that the program is relatively inexpensive. Also, Biosource has a liberal policy regarding making extra copies for classroom use. The program may keep students busy for a while.

3 IN 1: WORD RESCUE/ MATH MANIA/ FOREIGN FRENZY

Stardust Software

An arcade-format comprehensive educational package that offers practice in spelling, math, and French/Spanish vocabulary. For a complete review, please see the Reading and Language Skills section.

MOUSE MATH

Ventura

This low-res math program is a part of Ventura's *Learning Potpourri.* For a complete review of the package see the General Education section.

Reading and Language Skills

LOOK 'N HOOK

The Learning Line
$29.95
48K; II/IIe

Overall Rating	B+	A-	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	C+	*Value for Money*

Grades: Preschool-Adult

Parents and educators have long tried to make learning to combine letters fun for children, using magnetic letters or letter cards that the child can move around. *Look 'N Hook* employs the same approach in a crossword format, teaching the beginning readers (four to eight) how to spell and recognize twenty-four three-letter words of the consonant/vowel/consonant pattern.

Two disks contain a total of ten puzzles, each featuring four words. At the beginning of a game, each square has a picture of the object to be spelled; squares with a letter used for two words have a split picture. The child takes the hook over to the randomly arranged letters, snares one by pressing the fire button, moves it to the appropriate square, and places it there by pressing the fire button again. If the child has chosen the music option, part of a tune (such as "Yankee Doodle" or "Reveille") rewards him or her each time he or she puts a letter in place. The whole tune plays once all the letters are in place. On a color monitor, the letter also changes color (from green to bright orange on Disk 1) when correctly placed. Incorrect or misaligned placements simply cause the letter to appear back in the random group. Occasionally, the child may have to push the fire button twice to hook the letter or place it properly.

The non-reader can enter the program quite easily, but you will need to go over the pictures in the booklet with the child so he or she can recognize them on-screen. The fire button chooses music and one of the five puzzle arrangements. Once into the program, the child may want the aid of the pictures and words in the booklet. Soon, however, the child begins to remember some of the letters or, if an adult has worked on sounding out the parts of words with the child, he will choose intelligently. After two or three games, the child begins to encounter words he or she has worked out before.

When I tested this game on my four year old, he played it (with some adult help) for almost an hour, an impressive amount of time for someone that age to sit still. His only disappointment was that the completed puzzle didn't stay on the screen long enough for his mother to come and admire what he had done. Too, his initial difficulty in getting the hook positioned just right made me wonder if children with less developed fine motor skills might be better off with a keyboard option.

M-SS-NG L-NKS

Sunburst Education
$55.00
48K; II+/IIe/IIc/Franklin

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	B+	*Value for Money*

Grades: Preschool-Adult

M-ss-ng L-nks is a reading program that, according to its publisher, helps develop thinking skills, school skills, and computer related skills. I'm quite sure that it helps develop skills, but I'm not sure which ones. Anyway, it's well designed and functions well. In the home version of the game, you get nine excerpts from nine different books and can play on one of nine different levels ranging from consonants only (no vowels) to nothing at all (all blanks). You must guess the correct letter. Your score depends on a ratio of the number of wrong guesses to the number of guesses correct the first time to the number of answers the computer gives you. You preset the number of guesses you can make on any blank before the computer supplies the answer (but no more than five guesses).

Some of the levels of play are quite difficult, such as —e -e-e--i— o—y -o-e— (the level with only vowels) and no consonants. I'm not sure of the purpose of this kind of exercise, but the program claims to strengthen inborn language sense and improve reading compre-

hension, spelling, vocabulary, understanding of grammar, punctuation, and sentence structure. I suppose this may happen if you pay more attention to literature. Certainly the program includes excerpts from some fine literature, among them *The Secret Garden* by Frances Hodgson Burnett, *Charlie and the Chocolate Factory* by Roald Dahl, and *The Lion, the Witch, and the Wardrobe* by C. S. Lewis.

Two people can play. You can set the number of tries that each player gets before the program changes sides. With two evenly matched players, you add a sense of competition and uncertainty. The manual also suggests that you use the game to develop your own written shorthand. You can see while playing the game that you don't need all the letters in a word to understand it. An intriguing idea. Passages with no letters, only blanks to represent them, imply that you can learn to recognize the structure of the language and understand text without seeing all of the words. Perhaps there's something -- ----.

My major complaint about the program is that you can conceivably memorize a passage fairly quickly, thus invalidating the purpose of the guessing game. Another version, available from Sunburst's school catalog, allows you to enter passages yourself. This helps prevent rote memorization and allows you to update the program's content to reflect current topics of study.

I found *M-ss-ng L-nks* enjoyable and difficult on most levels, but I didn't use it long enough to find out if I could learn to read passages with no letters, only blanks.

LETTERS AND WORDS

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: Preschool-2

Designed for kids who are pre-kindergarteners and older, *Letters and Words* develops a child's reading readiness. Since it assumes the child can neither read nor write, the program doesn't ask for a name or expect the child to read any instructions; he only has to press the space bar when the chosen response is highlighted on the screen. For example, to respond "Yes, it is correct," the child presses the space bar when a white box moving across the screen frames a picture of a boy's head nodding up and down. A non-reader quickly masters this procedure.

Game 1 displays five uppercase letters in a row, all of which are in alphabetical order except for the middle letter, which may or may not be. The child must decide whether or not it is and give the proper response. Game 2 uses a "letter splitting machine" to produce an uppercase and lowercase letter. Do they match? Pressing the space bar enters an answer. Game 3 is the most elaborate. A Hi-Res picture, perhaps of a dog, appears on the screen with a word ("ball" or "box") beside it. The child then must decide if the word matches the picture.

In addition to answering a question "Yes" or "No," the child may press the space bar to choose "?" as a signal for help. Pressing the bar when the hand waving bye-bye is framed, quits the game. After the child has finished, press Control-T to get a utility menu with several handy options. You can call up a performance summary for the child with a separate listing for each of the three games, then reset all scores to zero and invite another child to play. You can also change the number of rounds in a game and select any of three word lists for Game 3.

I have difficulty finding fault with *Letters and Words*. Its time-tested teaching method, for better or worse, existed long before computers entered the classroom. A final note, however: Learning Well's $20 charge for a replacement disk after your six-month warranty expires seems less than forgiving.

SPELLING AND READING PRIMER

Edu-Ware
$39.95
48K; II/II+/IIe, Franklin Ace

Overall Rating	B-	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	A-	B-	*Value for Money*

Grades: Preschool-3

Spelling and Reading Primer teaches reading and spelling skills to children in kindergarten through third grade. The program offers three different modes: Reading Primer Drill, Spelling Bee Drill, and Spelling Bee Tutorial. All three use graphics and text to teach reading and spelling concepts. The package also provides two additional modes that allow a parent or teacher to set up individualized instruction for children of all ability levels, from the learning disabled to the gifted.

The model underlying the design of this program

assumes three things. First, learning proceeds from the concrete to the abstract. Thus, the Reading Primer and Spelling Bee Tutorial link the drawing of an object with the word itself. Spelling Bee Drill displays the drawing and asks the child to type the word correctly. Second, the program makes a strong association between the visual symbol and the correctly spelled word, so the child should never see incorrectly spelled words on the screen. Third, the child's interaction with the computer offers strong reinforcement because the child sees the computer as human and presumably seeks the same approval from the machine as from a parent or teacher. Therefore, each mode provides a musical sound and a figure with a smiling face to reward a correct response; an irritating buzzer and a frowning figure indicate an incorrect answer. Parents and teachers should evaluate and accept these assumptions before buying the program.

Spelling and Reading Primer contains the same extensive, well-written documentation found in other Edu-Ware packages. In addition, it includes a diagnostic subprogram which prints a message on the screen identifying the problem if the program does not operate the way it should. The index at the end of the documentation helps you locate information.

Despite all of these good points, some questions remain. For example, the demonstration and learning management modes require a good deal of time and effort to learn. Indeed, a parent or teacher may spend some time wandering around in the management system before becoming proficient in its use. Although the documentation assures you that this system requires only that a child know how to put a disk into the disk drive, turn on the computer, and use the keyboard, I would have to question whether a five or six year old child could accomplish these tasks independently. Finally, the graphics are not particularly creative or compelling despite their importance to the program's teaching. Given the short attention span of young children, more striking drawings would seem necessary to keep the child working at these reading and spelling tasks.

BRIAR ROSE/HANSEL AND GRETEL

Blythe Valley
$34.95 (each)
48K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	A/C	B	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: Preschool-4

These versions of the popular fairy tales were written by Susan Crandall and Thomas Halliday, for children up to the middle elementary years. Each program is an illustrated story with three reading level options. Parents of nonreaders can run the pictures without the text, and read the story out loud. A game feature allows children to choose the path the story will take, or you can author your own stories.

The highlight of these programs is the wonderful color panels created with Penguin Software's *Graphics Magician*. "Drawing in" the lines and colors creates the illusion of animation. For example, when the princess falls asleep you see the castle enveloped by a flowering rose. The child progresses from one screen to the next by simply pressing the space bar. Pressing the slash (/) key brings back the previous picture.

Toward the end of the story, as the prince enters the castle, or as Hansel and Gretel try to find their way back home, the child can choose which way (R or L) to go. The program doesn't let wrong guessers go too far astray. The text provides prompts which encourage the child to make a logical choice. (Since Hansel and Gretel are retracing their earlier path, their game is an exercise in memory skills.) Control-Q ends the game at any time.

A parent or teacher can manage the program in a number of ways, or even create a new story, using the pictures in any order. The game option can be eliminated, and the text level can be mandated. Text can be printed out or eliminated entirely. Thus, the child could start with just pictures, add the simplest text level, and so on as he becomes a better reader. For children who've gone beyond the highest level provided, a rudimentary text editor allows you to change the text. A short list of pictures and a viewing option assists you here.

In spite of the publisher's claims, I don't think most children will find the story-creation option very attractive. The documentation and commands make the process complex enough to require an adult on hand for the first run-through(s). Once I mastered the process, I still found picture selection and text entering to be somewhat cumbersome. It strikes me that a child young enough to like the story in the first place will

probably not be sophisticated or patient enough to do much creating on his own.

Consider *Briar Rose* or *Hansel and Gretel* if you want a colorful story that might stimulate children to improve their reading, memory, and reasoning abilities.

ALPHABET HARVEY

Queue Intellectual Software
$39.95
48K; II

Overall Rating	B	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B+	C+	*Value for Money*

Grades: K-2

Programmer Scott Rackey has computerized a classroom game that teaches the alphabet, forward and backward. The student "faces" three other players around a table, each of whom "says" a letter or a pair of letters in normal or reverse order when his turn comes. The player then types a letter or pair of letters within a preselected time limit (from one to sixty seconds). Correct answers earn ascending tones and an increase in score, after which the game goes on. When the player has successfully gone through the alphabet on a given level, the program moves up to the next higher level. A wrong answer receives frowns from the other players (who are never wrong themselves) and a couple of descending tones; a game ends when the player has a total of four wrong answers. At that point, the player's score is entered in a Hall of Fame, which keeps track of about thirty names and scores, listed in descending order.

The player can choose to start at any of the ten levels, from "Alphabet In Order" to "Alphabet Pairs Backwards With Harvey." To discourage students from always starting at the lowest level just to earn points, correct scores earn more points on higher levels and the player risks using up some of his four mistakes on the simple levels. The inevitable movement upward has two other consequences: younger players may hand over the game to an older player when it gets too difficult, and once a response time is set, players may become addicted to bettering previous scores.

Levels five through ten add two complications to the normal reverse-single-pair possibilities. At levels five and six, the player must use the letter "V" in place of a vowel. Once a vowel is so designated, the order of play is reversed (from clockwise to counterclockwise for instance), until the next vowel is named. At level seven, an invisible player named Harvey enters the game just to the right of the player. Since he's invisible, when he takes his turn a tone sounds, but no letter(s) appear on the screen. The player must take those unidentified letters into account before answering. If he errs, then Harvey moves one place counterclockwise.

Alphabet Harvey aims to make alphabetical sequencing more or less automatic. Higher levels add the skills of vowel recognition and memory of sequential or spatial changes. The ability to start at different levels and set different response times makes it possible for players of different ages to enjoy the game. The Hall of Fame encourages long-term competition, as well.

ADVENTURES IN SPACE

Queue Intellectual Software
$29.95
48K; II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

Grades: K-3

Using animated graphics, *Adventures in Space* teaches young students spacial relationships. Children learn the concepts of in/out, up/down, right/left, etc. by seeing the cursor move in an out of a box, up and down stairs, or in front of or behind a house. There are eight tutorial modules and two reviews which offer a combination of concepts.

Concepts are clearly explained, but younger students (K-1) will need help with the reading. Besides the animation, little melodies keeps their interest. Questions or sets of questions are asked concerning the location of the cursor, and there are two to five possible answers depending on the module. Answers are automatically accepted, the Return key brings up the next question. If the child answers incorrectly, he is given additional explanations; positive reinforcement is emphasized. It takes an average of fifteen to twenty minutes to complete a module.

Student scores, number right or wrong, and percentages are automatically recorded in the management portion of the program. These can be printed out or displayed on the screen. There is room for only ten student records, though, so a teacher will have to print out and then delete files on a regular basis. Customized scoring percentages can be formatted by the teacher.

I like *Adventures in Space* for its ease of use. Also, the program is educationally sound. With my assistance,

slow learning students and first and second graders are learning the concepts and having fun, too. Older students can use the program without supervision.

To answer questions, Queue maintains a toll-free number. The replace damaged disks for $3, and will add the management portion to older disks for a $10 fee.

READER RABBIT

The Learning Company
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: K-2

Reader Rabbit targets the five- to seven-year-olds on the threshold of reading. If a four-year-old can recognize a few of the letters of the alphabet, he can probably handle the first lesson.

The disk contains four lessons of increasing difficulty, all done in Hi-Res graphics. The first lesson places you at the end of an assembly line of three letter words. The program treats letters as shapes and asks you to make decisions according to your shape recognition of the letters of the words, which helps you learn to spell. You must separate those words with the proper letters in the proper place, from those without. The second lesson asks you to unscramble letters so that the resulting words match the pictures pasted on the sides of cartons, correctly labeling them. The third lesson asks you to load a train with successive words that differ by only one letter each time. The final lesson really consists of six progressively harder sessions of the card game, Concentration. The first session asks you to match pictures; the middle session has you match pictures with words or parts of words, and the final session has you match and remember the location of three-letter words.

Only two surprises cropped up that might delay the anxious parent who didn't read the documentation first. For one thing, you must center the joystick or game paddles before using the keyboard. For another, when choosing lessons 4a through 4f, you choose the letter before the number, typing in "a" before "4," for example. Odd quirks for an otherwise flawless educational tool.

SHORT VOWELS, LONG VOWELS, and LONG AND SHORT VOWEL DISCRIMINATION

Comp Ed
$21.95 (each)
48K; II/II+/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: K-3

These three programs form Comp Ed's progressive phonics series for kindergarten through third grade. Each module gives the child practice in recognizing and using the five vowel sounds in four different activities: indentifying the three-letter word containing the vowel under study, rearranging letters to form a word using the vowel, forming a common word using the vowel by adding an appropriate beginning consonant, and choosing the three- or four-letter word containing the vowel under study.

These programs contain many positive features. Clear onscreen directions are supported with examples. The text is written in large upper- and lowercase letters, and colorful graphics are used throughout. The program asks each child to enter his name on the screen and personalizes responses and scores as reinforcement. An easily accessed utility program allows a teacher or parent to keep or delete as many as ninety children's progress records, to adjust the speed of the material's presentation, and to turn off the program's sound. The documentation is brief but more than adequate. Finally, each module contains a short workbook that the program's authors encourage parents and teachers to reproduce for class use.

One point of caution might be made. At the beginning of each section of module, the program asks the child if he wants to win prizes. These prizes are apples in the form of the Apple logo displayed at the top of the screen for each correct answer. Teachers and parents may want to explain this motivational device to the child before he begins to prevent disappointment later.

Despite a very few questionable responses, the program deserves the NEA's endorsement as worthwhile educational software.

THE STORY TELLER

Blythe Valley
$34.95
48K; II+/IIe

Overall Rating	B-	B	*Reliability*
Ease of Use	C	C+	*Error Handling*
Documentation	B-	C+	*Value for Money*

Grades: K-3

What's more fun than making up stories! With pictures by Richard Crandall (most of which were first used in Blythe Valley's *Briar Rose* and *Hansel and Gretel*), Susan Crandall and Thomas Halliday have built a "vocabulary" of panels that a child can use to illustrate his own story. A young child will need help in creating a story, although with this program it is not all that difficult. A suggested procedure would be to plan the order of the pictures and the text first, then perhaps go through the story making any changes that seem necessary.

The pictures would favor a story about a boy and a girl, or a prince and a princess, who encounter each other—or a wizard, an ogre, fairy, King and Queen, unicorn, dragon, and so on—in a castle, house, or a setting in nature. The range is adequate, although it would be nice to have close-ups of each of the potential protagonists for "reaction shots." The color quality of the pictures and the gradual filling in of each (which creates the effect of animation) are quite good.

You can preview the pictures, enter and edit text for each picture you've selected, and save (or delete) the story on the original disk (there's room for up to three stories) or on a separate data disk. Since a data disk stores only text, however, you will always need the graphics side of the original program to run the story. You can also print out the text, a valuable feature for catching errors, planning changes, or teaching reading skills separately from the pictures.

Unfortunately, all is not rosy. Writing and editing are helped along by a number of prompts, but a mistake in an entry can dump you outside the program and into BASIC. You also need to carefully track the record, picture, and line numbers while you are creating. *The Story Teller* has some good points to it, but there's still a lot of room for improvement.

CAT 'N MOUSE

Mind Play
$49.99
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	C	*Error Handling*
Documentation	B	B-	*Value for Money*

Grades: K-6

Cat 'n Mouse is a maze game designed for children ages five to twelve that teaches word and picture association, as well as antonyms, synonyms, and grouping. The player manipulates a mouse being chased through a maze by a number of cats. The maze also contains a number of dogs, all named Spot, that offer you some refuge from the cats. These "safety Spots" (cute, huh?) require that you match various words and pictures in order to continue after meeting them. A correct answer sends the cats back to their starting point, thereby making your escape out of the maze easier, while incorrect answers send *you* back to beginning. Each successive maze has more cats, making your escapes increasingly difficult. The maze can be negotiated with the arrow keys, but most children will need a joystick.

Customizing the word and picture associations is almost as much fun as playing the game. There are three types of associations: two pictures, for teaching about opposites; one picture and one word, for matching the word to the picture; and two pictures and one word, for teaching about synonyms. *Cat 'n Mouse* has a set of associations already programmed for each of the above categories, and has five empty sets that you can program yourself, a process they call "building a set." For these, you can choose from the picture library which contains sixty different pictures, all of excellent graphic quality.

Two other association categories let you construct word/word and grouping questions. Word/word associations are pairs of words with a certain relationship, such as New York and NY. Some of the words have more than one logical association, but only one strong association. This category really allows you to use your imagination; my kids and I set up a Bible trivia type of game. Grouping involves selecting words that form a group of things that belong together, such as vegetables, and then putting in a group of words that might be similar, but do not belong in that group, such as various fruit. My ten-year-old showed the most interest in the word/word and grouping sets.

With all this customizing, there is one problem. If you misspell a word, or change your mind after hitting Return, you can't go back and retype it. With thirty-six words in each set, the likelihood of not misspelling anything, or not changing your mind, is quite low.

The game can be easy, normal, or hard, and the cats can be stupid, normal, or smart. You can have up to nine mice. My documentation called the cat intelligence levels low, normal, and high, but it hardly seems to matter what you call them. The documentation also explained how to change the number of dogs, which is not mentioned in the game.

The actual learning takes place as the player views the associations. These are visible when the mouse encounters Spot, which only happens three times in the lower mazes, and fewer times on higher levels. From the very beginning, the player can avoid Spot altogether, so I made a rule that my children had to encounter every dog in every maze.

This program has excellent potential, but the few problems detract from its overall good effect.

RACE THE CLOCK

Mindplay
$39.99
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B+	A-	*Value for Money*

Grades: K-7

Race the Clock is an adaptation of the TV show "Concentration." The usual grid of boxes is displayed on the screen behind which are hidden either pictures, words, or a combination of the two. You uncover successive pairs of boxes looking for a match. Since the game is played as a "race against the clock," in order to win, you must find all the matching pairs before time expires.

The aim is to develop the word and picture association skills of children between the ages of five and twelve, with special emphasis on verbs. The younger children start out with the picture/picture matching option. Each of the pictures corresponds to a verb contained in a series of word lists stored on the disk. *Race the Clock* cleverly uses animation to carry out the action portrayed by that verb. The graphics are visually attractive and very well executed. In the picture/-word option, children match the animated pictures with the actual word. Finally, the word/word option strengthens word recognition skills for older children.

For each of the above options, you select the size of the grid from three choices, and set the time limit. You can also create and store ten of your own matching word sets which can then be used in a word/word matching game. This would allow your child to work with words other than verbs and numbers.

The entire program is menu-driven and simple to use. On the negative side, the program must be rebooted each time a game has been completed rather than allowing you to return to the main menu, select a different option, and play again. Only if the child wants to replay the*identical* game (for instance, for purposes of practice) can he avoid having to reboot. Another minor hassle is that for each game played, you must choose your input controller (keyboard, joystick, Apple mouse, etc.). It seems to me that you should only have to make this choice once and then be allowed to save this information on the disk. Correcting both these problems would make the program easier for young children to use without help from an adult.

The documentation that accompanies the software is short and simple, but sufficient; the program is really self-explanatory. The instruction booklet contains a nice section on parental or teacher guidance for helping the student to get the most from the program.

Race the Clock is a well-conceived and entertaining piece of educational software. The animation really helps children understand what an action verb is. Playing the game may also strengthen memory, and powers of concentration. Although it is not totally original in its concept (there are other, similar programs out there in the marketplace), *Race the Clock* is skillfully crafted and worth buying.

FAY'S WORD RALLY

Didatech Software
$49.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 1-3

I tried very hard to keep from giving this program almost all A's, but I just couldn't find fault with it. It is educational, interesting, active; a game all ages can play. You match words to meanings using opposites, synonyms, homonyms, analogies, categories, rhymes, definitions, and visual clues. You do this by racing a car through a small maze-like race track to reach the word of your choice in the shortest possible time, trying not hit any obstacles.

You control the car with either the keyboard or a joystick. Unlike most games, using the keyboard is not difficult as there is a short tutorial to guide you. If you want, you may drive your car on simple streets until you're experienced enough for the track. Words on the

lowest levels are geared to beginning readers, while the upper levels (there are eighty in all) get relatively difficult for third graders. With the ability to time your tries and increase your speed, there is an unlimited amount of flexibility involved.

Even with eighty different levels, though, you can run out of words to teach. Have no fear, the teachers' edition allows you to "CYOG" (Create Your Own Game) as well as having an "RKS" (Record Keeping System) to keep track of student scores. Need a new design for one of the visual aids? The CYOG has one, with easy instructions to make your own. Need more ideas? Hints and suggestions abound in the well-written manuals, along with enough information to help you imagine how it will all fit together.

The only thing I could find to complain about is the fact that there is no reward system. But the game is so much fun, just being allowed to play may be reward enough.

WORD SPINNER

The Learning Company
$34.95
48K; Apple II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 1-5

Word Spinner is a complete-the-word game for six- to ten-year-olds. You can choose between three-and four-letter words, set the blank spaces at any point, and race against the clock or take your time. The three-letter words are fairly easy, but a race against time using four-letter words can really challenge you. The partial word appears at the top of a spinner design. You cycle through the alphabet using only two keys on the keyboard, which means that very young children can use the program to practice word recognition. When you think you have a word, press the space bar. The program checks its validity and whether the word has been used before. If it accepts the word, the program places the word on a space in the spinner. If you fill in the spaces on the spinner within the allotted two minutes, you can go on. A score of 300 earns you a chance to spin for an imaginary prize.

The program is easy to use. It comes with an excellent thirty-one-page manual that you really don't need. The manual includes ideas for additional activities to enhance *Word Spinner's* educational value. The graphics and sound (which you can turn off) are very good. The addictive game play resembles computerized *Scrabble*, yet makes a good introductory program for small children because of the minimal keyboard manipulation required (especially with the timer turned off).

The disk is copy-protected, which is a shame for a program meant for small children. A replacement for a damaged disk costs $10. *Word Spinner* is otherwise an excellent value from The Learning Company and worth every penny of its price tag.

PAVE

Instructional Communications Technology, Inc.
$80.00
48K; II/II+/IIe/IIc

Overall Rating	C+	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	C-	*Value for Money*

Grades: 1-6

Instructional/Communications Technology, whose experience with reading training goes back some forty years, has now entered the field of computer-assisted instruction with *PAVE* (Perceptual Accuracy/Visual Efficiency Training). The program employs two tried and true techniques—flash and scan—to help a broad range of reading students increase their attention and build orderly reading habits. This smooth-running, utilitarian program marks a natural adaptation of tachistoscopic methods to the Apple, but is best suited for institutional use because of its functional nature.

In scan training, the program first presents a target letter or number which you must track as it appears with a random series displayed at varying rates. The random symbols (including numerals and upper- or lowercase letters) scan from left to right at varying rates. Depending on the level of instruction, you must either press the Space bar or silently keep count of each appearance of the target element. The beginning scan rate is pre-set, but automatically increases or decreases depending upon the accuracy of your response. Speed ranges are from ten to thirty lines per minute to forty to eighty lines per minute. Following each exercise, the program compares your count to the correct frequency of target appearance.

In flash training, one to twelve numerals or letters flash on the screen for different amounts of time. You must call out or write down what you see. The program subtly increases the flash rate in case of consistently accurate responses and slows it down when the opposite occurs. The rates range from very slow with few

numbers to very fast with many. Following each drill, you can compare your responses to what actually appeared.

A management program allows you to keep records for up to one hundred students. First you should use the program's pre-test to determine the optimum training entry level for each student. During the actual training, however, each student's scan and flash abilities cause the program to adjust speed automatically. You enter the menu-driven and easily manipulated management program at the title screen by pressing Control-I. It allows you to list students and update or clear files. The file program keeps up with preassigned and achieved rates using the different target elements. You can modify the testing format and choose to include a positive or negative tone to emphasize errors or success.

I had no trouble at all operating the program. The menus are simple and accessible even to people unfamiliar with computers. Keeping files is straightforward. The broad training range offers speeds and levels of difficulty ranging from very easy to impossible. The documentation is clear and complete, as you would expect from a reading technology company. The twenty-four-page, large format teacher's guide presents a step-by-step graphic explanation of the program's operation and objectives. Other materials include record-keeping forms, a cue sheet which condenses the guide book, and a bibliography on reading instruction. In addition to the one-sided program disk, you get another disk as a backup.

PAVE attempts to develop and discipline learning techniques such as accurate, orderly seeing; strong visual memory; and competent tracking of written matter. Considering those objectives, *PAVE* impressed me with its range of application and subtlety in adjusting flash and scan rates to the quality of student reponse. I certainly recommend these functional reading drills, especially for institutional use.

SENTENCES

Micro Power and Light
$24.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 2-3

Sentences is geared to second and third grade students. The program uses a baseball game format to help the child identify the subject, predicate, and sentence fragments of complete sentences. When the correct answer is given, the child is rewarded with a point. Review is available if the child is having difficulty or simply wants reinforcement. By the end of the program, the child should be writing his own sentences. Although I think this program would be more useful if the authors had included tests on other parts of speech, this program has enough variation to be interesting and enjoyable to the primary student.

READING FOR DETAIL—RED LEVEL EDITION

Learning Well
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	C	*Value for Money*

Grades: 2-3.5

Reading for Detail—Red Level Edition is designed to give children in grades two through three practice in answering "Who, What, When, and Where" after reading short paragraphs presented in random order. Each reader has a "horse" represented by a number from 1 to 6 that moves ahead the number of spaces indicated by the spinner onscreen. If a child's horse lands on a blue square, (s)he chooses a type of question to answer. A correct answer moves the horse ahead one more space.

Fragments of music embellish the beginning and the end of the program, and the well done graphics hold the attention while you wait for the next question. As a game, I doubt that *Reading for Detail* gives all players an equal chance, but the questions and reading material are well chosen to help young readers develop basic reading comprehension skills.

GALAXY SEARCH

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: Red Level 2-3.5
Blue Level 3.5-5

Galaxy Search belongs to Learning Well's collection of "playful software for serious learning." Concerning itself with reading comprehension, it tests your ability to make logical predictions based on given information. One version of the program targets grades two and three; the other four and five. The program holds your interest by intermingling video game action with a reading comprehension drill—a bit of sugar to help the medicine go down.

Players travel through a galaxy in search of robot parts hidden on various planets. The first to collect the three parts needed to construct a robot wins. You guide your spaceship to a planet using keyboard control. Take care to avoid meteors and not to expend all your fuel. Once safely landed, if you're lucky you'll meet a robed character who poses a word problem. With sharp reading and reasoning abilities you can supply the correct answer and win a robot part. The first player to complete a robot returns to Earth for a victory ceremony.

Galaxy Search offers the teacher many features which ought to be standard in all educational software. Using a secret code, you can access a utility menu with several options that enhance the program's value. First, you can create a list of authorized users (no one else can play). Their scores are automatically saved on disk after every game and you can call up the list of records at any time. Finally, you can change various game parameters, such as ship speed, availability of fuel, and probability of encountering a meteor. This allows you to adjust the challenge to match the player's abilities.

Could any improvements be made? A few. The word problems would benefit from a bit more creativity. Ideally, they should have a common theme or relate to the space travel adventure. Also, the teacher should have the option of writing his own problems to fit the curriculum. Finally, the replacement policy could be more generous. You do not get a backup disk and must pay $20 for a replacement once the six month warranty expires.

All reservations aside, you can count on this program to provide hours of learning fun in the classroom.

MAGIC CASTLE

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: Red Level 2-3.5
Blue Level 3.5-5

In this vocabulary game, you try to reach the top of a magic castle, ascending another level each time you choose the correct definition of a word from the list of choices. Wild card appearances of Merlin, who can accelerate or retard your progress, diversify the game.

Although I thought the animation interesting, the highly repetitious format of *Magic Castle* soon becomes tiresome. More ingenuity in game design would pay off in increased motivation for learning. As it stands, the rapid loss of novelty turns *Magic Castle* into a word definition/vocabulary drill.

Playing instructions on the disk itself mean that you need not refer to the documentation, good as it is. Disk utilities provide built-in class rosters and score records for classroom situations. The manual also makes suggestions for follow-up activities to enhance the program's effectiveness.

READING ADVENTURE I

Queue Intellectual Software
$39.95
48K; II+/IIe

Overall Rating	A-	B+	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A-	*Value for Money*

Grades: 2-6

Reading Adventure I teaches decision making and reading skills. Following the popular "choose your own adventure" format, the student moves through one of two stories by reading portions of the story and deciding where to go next based on the text. Second and third graders can use this program, but older students will really enjoy its format, challenge, and flexibility. Remedial reading students will also benefit from the reading experience. The program can be used individually or for team play.

In "Three Ponies," each portion of text is followed by three choices. One choice is a poor choice with no point value. The other two choices are story branches. The

story develops according to what choices the student makes. In "Nancy, Amy, Jim and Tom" the student can choose from four answers, but only two of them make sense in the context of the story. This is a complex story with numerous branches. Scoring varies from 0 to 200 points, according to the player's choices.

It may take from ten to thirty minutes to complete a story, but students can save the game at certain points and return later. Up to seventy-five student names can be kept with scores and saved stories. The top forty scores are recorded in the Hall of Fame which students can see after completing a story. This rotating file replaces lower scores with new equal or better scores continually. For these features, no teacher review or maintenance is needed. However, the teacher may want to clear some or all student files periodically.

Queue provides a toll-free number for assistance. They replace damaged disks for a $3 fee.

I think the format of *Reading Adventure I* makes it an interesting program. It is well written, easy to use, and might stimulate reluctant readers. Although it helps improve reading skills and provides a challenge, its lack of graphics is a detraction, especially in light of its young audience.

FAY: THE WORD HUNTER

Didatech Software
$29.95
48K; II

Overall Rating	A	B	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	C+	A	*Value for Money*

Grades: 2-7

If you want to have fun and learn at the same time, try this game. For starters, you maneuver Fay, an undersea diver, around the block of words on the screen. When you have your sights set on a line of letters that contains one of the hidden words, you fire your phaser. Letters from both ends of the hidden word disappear, leaving your targeted word isolated. You need speed and accuracy to beat the time period and the limited number of shots available to you. The time and shots remaining determine your time to play in the second section of the game. Bonus play consists of swimming around and grabbing the jewels that appear randomly on the screen. To make matters difficult (and twice as much fun), add a jewel-hungry sub, a mean crab, and a speedy shark. You can stun any or all three of the competition while grabbing the gems—as long as you still have a charge on your phaser.

I really like the fact that you don't just learn to pick words form a jumbled group of letters. If you don't find all of the hidden words, you don't get to play the game. If you do, the speed and accuracy of your choices give you extra time to play.

The manual says that the program targets grades three through ten, but I don't think I'd put an upper grade or age limit on it. I have seen just as many adults as children fighting over who gets to play next. Since the game offers six levels, each person can work on the level best suited to his age. Each level uses words of greater complexity, length, and frequency of use, drawing upon a pool of 3,000 words on the disk. An Authoring System allows you to add lists of words that may have special meaning for you or your students. You store this list on a separate disk, which means unlimited selection and levels of difficulty. On top of this, Didatech Software offers a backup disk for $10 if you have registered your purchase, plus replacements of damaged disks for the same charge.

Given all this, is there anything wrong with the program? Little, really. I sometimes found it difficult to tell the difference between the M, H, and W on the Hi-Res screen. Also, controlling Fay with the keyboard or optional joystick can become rather tricky, but that's all part of the game and adds to the skill required. You can enjoy and learn—but watch out, it's habit forming.

READING AND THINKING PRACTICAL GRAMMAR LEARNING PARTS OF SPEECH PRACTICAL COMPOSITION

Queue Intellectual Software
See Below*
48K; II/II+/IIe/IIc

Overall Rating	C+	B-	*Reliability*
Ease of Use	B	C+	*Error Handling*
Documentation	B-	C	*Value for Money*

Grades: 2-12

The reviews which follow are on parts of four multi-disk educational review and practice series produced by Intellectual Software for use in English composition programs. They are useful at various levels, from the upper elementary classroom to the college writing lab. The individual disks vary in price from one set to another. So here's the way it works: The *Reading and*

Thinking Series has four levels and a management system. Levels I and II (second and third grades, and fourth and fifth grades, respectively) are $54.95 each, or $74.95 each with the management system. Levels III and IV (sixth through eighth grades, and high school, respectively) are $54.95 each.

Practical Grammar has thirteen disks plus a text book. All but the last are $24.95 each or $34.95 each with the management system. Number thirteen is $44.95 or $54.95. Practical Grammar II has fourteen disks and a text. Disks one through thirteen are either $24.95 each or $34.95 each with the management system. Disk fourteen is $44.95 or $54.95. Practical Grammar III includes seven disks which cost $34.95 each or $44.95.

Learning Parts of Speech includes six disks at $29.95 each or $39.95 with the management system.

Practical Composition 1 has four disks for $115 (all) or $155 with the management system. Package II has two disks for $65 (all) or $85 with the management system.

The chief advantage of this series of programs is their provision for tutorial assistance to students who need either a thorough study of certain skills related to composition or a partial review of selected skills. Each program can include an automatic classroom management module which allows the teacher to maintain records on various students and review their records and performance on various modules.

The chief disadvantage here would seem to be the cost (though these may not be too high for a school that can make use of the programs in writing labs or similar computer assisted composition labs). Another kind of disadvantage is that these programs, like so many other tutorials, offer little that is not available to a student in a printed workbook and do not, finally, represent a pedagogical step forward. Though they can provide quicker feedback on student responses to questions and may offer more frequent encouragement then printed review texts, the disk tutorials are more limited than printed texts in their examples and questions, and they provide little that is really helpful in understanding or correcting mistakes. I found all of the programs a bit frustrating for the slow motion typing of answers required; this typing delay leads to occasional faulty answer entries, and since the response to error is not selective, a typo usually counts as an error in judgement.

Reading and Thinking

This program attempts to teach inferential thinking skills to readers in or above second grade. The basic design is simply textbook on disk. The student chooses a module and the menu-driven program presents a brief narrative (rarely more than four sentences), then asks two to four questions, each of which invites a response based on inferences drawn from the narrative. Each module contains from four to eight such narrative sequences, and after the student has answered all questions in the module, a summary of his performance is displayed with number correct, number incorrect, and percent correct.

The program functions smoothly enough, though its slow speed and response time take some adjustment after working with more sophisticated programs. I find the basic text on screen format inefficient. Aside from that, there are these limitations: (a) When answering a question, the student is usually asked to choose from among two or three possible answers on the screen; however, the program will accept letter answers other than those shown. (b) If there are three possible answers—A, B, or C—and the user types in D or E, the program accepts and records this as an error; if other letters are typed, a prompt is given and a second allowed.

Incorrect responses are followed by explanatory sentences which, not infrequently are insufficient, logically fallacious, or dependent upon stereotyped associations. These seem especially troubling in a program designed to teach clear thinking.

(c) No provisions are made for retesting over items missed or items similar to those missed. The bank of questions is quite limited.

There is a real need for educational programs that can teach clear thinking to elementary students. This program may take a first step in that direction, but it is the sort of program we can hope will be replaced by a new generation of better ones in a few years.

Practical Grammar (Principal Parts of Verbs)

This is the most comprehensive of the series and, I suspect, the most useful in a classroom or writing lab setting. Each of the thirty-four disks in the packages deals with a series of related concepts in grammar; each one explains the concepts, tests the student's understanding, and offers examples to strengthen understanding. Testing methods vary slightly.

The interactivity of the programs is perhaps their strongest quality. Feedback is given on each individual response, and most of the feedback is positive and encouraging. Incorrect answers are followed by explanations of why the correct choice is correct; unfortunately, these explanations are selective and do respond to the source of most errors.

As with the other Intellectual Software programs, these are menu-driven and allow the teacher to maintain a classroom management module which could be helpful in keeping records and/or overseeing student progress.

Though it is the most expensive of the sets, *Practical Grammar* seems to be the one most readily and broadly adaptable to the English composition class at almost any grade level. As with grammar drill exercises in any other format, this will probably not significantly improve

composition skills, but it will allow students to increase recognition of certain grammatical distinctions.

Learning Parts of Speech (Adjectives: Adding New Ideas to Nouns and Pronouns)

This series is designed as an introduction or review of the parts of speech for children in grades five through eight, but could serve some students at higher grade levels as well. Its purpose is appropriately limited and its objectives seem to be reasonable and precise. As with the other Intellectual Software programs of this sort, its chief benefit would appear to be the immediate feedback provided by the review format. Programs in the series can be used independently or comprehensively, but purchasers should think in terms of obtaining the entire series. Some variety in test format is provided, as in other IS series, and a classroom management module is again a built-in feature of the program.

Practical Composition (Making Words Work)

No review program using multiple choice and fill in the blank questions will effectively develop composition skills, and this one is no exception. The series provides a tutorial on the rules of good writing and some hypothetical writing situations in which certain choices are allowable. Both exercises are worthwhile, but, though they may effectively teach a recognition of rules, they do not teach the independent generation of written prose which is essential to effective composition instruction.

The manual suggests that the user should finish the series with the ability to distinguish complete sentences from sentence fragments, with some sense of how to choose words for accurate, forceful communication, and with the ability to distinguish among description, narration, exposition, and argumentation. The exercises provide opportunities to make choices related to these skills, and the program provides immediate feedback and some explanation of principles underlying correct choices. Again, a classroom management module is available to help a teacher check the progress of students using the program.

The key weakness of this series is not in its particular design but in the basic incompatibility of writing skills with any programmed approach to instruction. Some students will be helped by this, as by each of the Intellectual Software series, but of the four series reviewed here, this one and the one entitled *Reading and Thinking* seem relatively less useful than the other two.

THAT'S MY STORY

Learning Well
$59.95 (2 disks)
48K

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 2-12

That's My Story combines the computer's word processing ability and a modular approach to creating story ideas and plots. Young authors get incomplete plots containing one or more problems. They try to resolve the problem by creatively extending or completing the story. "What if" scenarios make further extensions possible. The program's twelve plots of vary-ing difficulty suit grades two through eight, and provisions have been made for the inclusion of additional stories. Once written, stories can be stored on disk and printed out. A well ordered set of record-keeping utilities make this program well suited for formal classroom instruction.

Several drawbacks reduce the effectiveness of the program. For one thing, the text editor is awkward. Each time you insert or erase a character or block of characters, the prompt returns to the end of the page and you must bring it back for further editing. Very tedious. Also, the instruction manual, although easy to understand, is hard to look at because of the poor design and obviously cheap manufacture.

CRYPTOCUBE

DesignWare
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 3 to Adult

This game works splendidly. You see one face of a four-faced cube (a la Rubik's, but with 49-100 squares per side). Hidden are words arranged in crossword puzzle fashion. After moving the cursor to the desired square, you press the space bar. If a blank or vowel appears, you get five points for the vowel or no points for the blank. You must guess the consonant. A correct guess nets you ten points and uncovers the letter, while an incorrect one costs you five points. You try to

uncover the words on all four sides of the cube worth the greatest number of points.

After viewing the demo, I went forward with nary a look at the manual. As usual, DesignWare makes it simple to get the game under way. After choosing a list of words from the fifty possible categories (including things to eat, composers, Latin roots), you can view the twenty words before beginning. This may not help when you have to guess a consonant, but at least you'll have an idea of the words hiding from you. Next you can choose to have the computer make a new puzzle from the words, or play the resident puzzle. This offers a valuable expansion. Then the cube appears and you begin uncovering squares using Control-J, K, I, and M and the space bar. If you have to guess a consonant and get totally stumped, a "!" calls up the list again so that you can search for possibilities. For example, you might want to look for consonants to complete the already revealed "-a-i—." Periodically you get a bonus from the cute little Wuzzle that reveals one square on the side you're working on and one somewhere else on the cube. Finish one side, enter "*" to rotate the cube, and on you go.

I would like to congratulate the makers of this game. Unlike some programs, things happen as they're supposed to and a mistake on your part won't kill the program. Directions are clear, easily understood, and always there when you need them. The graphics are clever and the program keeps you from feeling like a dolt just out of the pumpkin patch when you play. *Cryptocube* supposedly helps build vocabulary and spelling skills, but the second and third graders I tried it on (and I) found that purpose tangential to the challenge of completing the puzzle. Of course, looking at the word list leaves less to luck and stimulates thinking about possibilities. Having the computer make new puzzles out of existing word lists means lots of variations, and to ice the cake, the program lets you make your own word lists for puzzles. What more could you ask?

BANK STREET STORYBOOK

Mindscape, Inc.
$39.95
64K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 3-6

This creative program allows children to write illustrated, animated stories on the computer and print out the text. It includes an introduction to the program and nine sample stories of varying complexity that stimulate the imaginations of young writers.

With the program, the child can create a story, place the text in different areas of the screen, and color and animate his illustrations. Two other functions called Wait and Flip let the writer use pauses to accentuate the pacing in his story. The editing function lets him revise and proofread his story.

The program contains many excellent features that will enable a young person to develop his creativity and thinking and writing skills. First, the program's materials are appropriately presented for the suggested age level, and the program becomes more challenging as the child becomes more skilled. Second, the program contains an onscreen menu of all its functions and a help message of hints. Other important commands appear on an accompanying Quick Reference Card. Third, *StoryBook* utilizes a well-written, conveniently organized manual that takes the child through each step in the writing process. Using an appropriate level of language and easily understood graphics, this manual makes creating, writing, and editing a story accessible to an eight-year-old. Fourth, the tutorials on the disk and in the manual contains presents a guide for creating a sample story. The tutorial describes all the steps in writing and editing a story and gives the child practice at creating a short sample story. The manual and the tutorial convey a tone of challenge and fun that should appeal to young writers.

StoryBook is the kind of program that demonstrates the excellent potential for teaching children with computers, especially thinking and writing skills. Educators and parents will like the possibilities for individualized instruction since the program allows any young writer to approach the creative task on his own level of thinking and writing. While designed for young people and limited to some extent in complexity, the program may also offer opportunities to the older writer looking for inspiration.

KIDWRITER

Spinnaker Software
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	D	B	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 3-6

Kidwriter is a terrific idea: It lets kids create their own picture books and provides a very simple word processing program so they can write stories to go with the pictures. The execution doesn't quite live up to the promise, but the program is still worth a look.

The program begins with a cute tune (which seems longer and longer every time you hear it), then shows a self-running tutorial which you can stop by hitting any key. A menu offers these options: (M)ake a Picture-Story, (L)oad an Old Picture-Story, (D)irectory of Picture-Stories, (Q)uit for now. The next menu allows you to choose one of ten scenes, including a moonscape, a room, a picture frame, a stage, and a couple of outdoor landscapes. You select objects to put in the landscape from a series of ninety-nine people, houses, cars, space ships, letters, and numbers that appear at the lower left. (F)orward advances through the series, (B)ack goes in reverse. To select an object, press (P)ick. The arrow keys move the object about. You can choose from four sizes and colors for each object.

When you have completed a picture, you can write a story about it on the program's rudimentary word processing system. Stories can extend for any number of pages and can be saved on disk, but you can't print them out.

The idea of having kids write stories based on their own pictures fits into what we know as the "language experience" approach to teaching reading and writing, a theory very much au courant and supported by research. *Kidwriter* scores high marks for this approach.

The program literature says the program targets youngsters six to ten, but most youngsters at the lower end of the range will find the command menus too difficult to use without help. The program offers a fairly limited choice of objects and scenes, with rather crude figures. People only smile in these stories. The word processing option also leaves something to be desired. It's simple enough, but you can only write seven lines about each picture before the word processor begins typing over the first line. If you elect to go to the next page, you must create a new picture. (Inexplicably, the box includes a note that incorrectly says the program works only with the Caps Lock key down.)

Kidwriter is an interesting but limited program. It may give some youngsters a start in writing (and word processing), but many will probably make pictures without writing if left unattended. Others may tire of it quickly. For $34.95, it's worth considering if your child reacts favorably to using it.

PLAY ON WORDS

Queue Intellectual Software
$29.95
48K; II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B-	C+	*Value for Money*

Grades: 3-6

Play on Words is a game of word puzzles designed to teach analytical and reasoning skills. Each rebus depicts a commonly used word, phrase, saying, name, or title and is made up of letters, numbers, and symbols. You must closely examine the way these are arranged on the screen, paying attention to even such aspects as their shape, size, location, and relative position to each other in order to solve the puzzle.

There are eleven different categories: Famous People, Book Titles, Song Titles, Movie Titles, Sports, Geography, Nouns and Verbs, Adjective Nouns, Phrases, Quotes and Sayings, and Puzzles for Children. There are about a dozen puzzles in each category. Once you correctly solve the puzzle, you are awarded 100 points. If you need help, you can ask for a hint. There is only one hint per puzzle, and asking for it cuts your score in half. After each correct answer, you are also given an additional treat, if you like corny humor, that is. These are usually puns and some of them are so bad, they're good, if you know what I mean.

The concept and the puzzles themselves are fine, but there are a number of problems with the overall design of this program. If you don't answer correctly, and just give up, you cannot get the correct answer. I was informed that the updated version will have the answers in the documentation. Speaking of which, the documentation adequately explains the program, but I hardly call four pages stapled together a "teachers' manual." The little investment they put in this is consistent with the little investment they put into the program.

You can save seventy-five games in progress, but you can't move into a category of your choice. If my son has no interest in doing Song Titles, he still has to muddle through it. You cannot skip any category. This is extremely frustrating.

There's no doubt that *Play on Words* offers a challenge and fun. It's just unfortunate that it is not more flexible and accommodating. There is no option to program your own puzzles, so once you have figured out the all the ones given, there is no reason to play it again. The addition of some minor graphics would really dress it up, too.

If you have a damaged disk, Queue will replace it for a $3 fee, with no time limit on this offer. There is also a toll free number to call for assistance. Naturally, the low price reflects the fact that this is a no-frills program. However, considering what it lacks, the price should be even lower.

WORDMAN

DLM
$44.00
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 3-6

Quick word recognition seems the primary benefit of using *Wordman*, a program in the Arcademic language arts series. As a changing consonant moves around the outside of a box, you decide whether to fire at the two to three letter combinations in various windows within the box according to whether the moving letter would form a word when placed in front of each combination. A miss, indicated by a short buzz, occurs when you fire at letters which would not form a word, or past letters which would form a word. If you get all the possibilities before the time runs out, you move to the next box, each inside the last for a total of five increasingly smaller boxes. If you normally play arcade games, the absence of bells and lights when you reach the innermost box may disappoint you. The boxes simply form again and again until time runs out. You must find your reward in the number of hits, competing against a previous score of the same game session. The score shows current highs and lows as well as a given game score, letting you compete against yourself or someone else.

You can begin to play with minimal instruction. Several fire keys, a paddle/joystick option, a terminate game command, and a change program command provide *Wordman* with a great deal of versatility. You can choose from nine speeds, featuring from nineteen to thirty-six window words; run-times from one to five minutes; sound or silence; and short or long (or both) word/sound patterns for each vowel. The short pattern consists of consonant-vowel-consonant; the long, of consonant-vowel-consonant-silent "e."

Like others in the Arcademic series, *Wordman* comes with a complete manual and a number of worksheets for the teacher or parent. This game does require some intervention if you expect to learn the meaning of new words rather than just knowing you have gotten the right combination of letters. The manual identifies the purpose of the game as providing players with a "highly motivating and challenging means of practicing the basic phonetic patterns" associated with short and long vowel sounds. Obviously, you need some background in those sounds to begin with, and a means of expanding that knowledge.

CLOZE PLUS

Milliken Publishing Company
$150.00 (one level) or $425.00 (three levels)
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 3-8

Cloze Plus, a reading improvement program, teaches vocabulary and comprehension skills by means of a structured cloze system and context analysis strategies. Six sets of disks cover reading levels 3 through 8, each set containing four disks offering five different reading selections of varying difficulty apiece. The program is part of a larger, off-line system that includes cassette tapes, filmstrips, and activity books, all of which reinforce the context analysis techniques taught by *Cloze Plus*. The program suits students from elementary grades through adult.

Cloze Plus teaches students to see word relationships; determine meaning using context, semantic, and syntactic clues; and make logical predictions using both literal and inferential understanding of the reading material. Using structured cloze and vocabulary in context, the program teaches eleven reading and thinking skills, including definition, classification, order, summary, and synthesis. The completion activities are appropriate for developing skills as promised, and should lead to a student's reaching the program's objectives.

The documentation is outstanding. A well-written Teacher's Guide accompanying each set of disks clearly describes the educational philosophy behind the program and how to operate the system either for a single

student or the whole class. An Easy-Does-It card gives the student step-by-step directions on how to use the computer and run the program.

The learner management system constitutes a second asset. Each disk can handle the records of five classes totaling 100 students. The management system allows you to make individual assignments and review student progress. A password security system keeps all your entries and student progress confidential. For people with short memories, the system offers reminders of passwords previously chosen by students or teachers.

Despite my pleasure in the program, I must point out that the graphics that form as the student correctly answers questions about the reading selection offer ineffective reinforcement. Moreover, they are inappropriate for older students working with the program. Keeping this reservation in mind, I highly recommend *Cloze Plus* to teach reading skills.

VERB VIPER

DLM
$44.00
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B-	B-	*Value for Money*

Grades: 3-8

In this game, a dragon (you) must decide whether to eat or reject verbs marching toward him from the lowest of a series of caves on the right side of the screen. A changing subject phrase immediately below his head dictates the success or failure of the decision. Enough correct decisions and the dragon's head stretches up to the next higher cave. Because each succeeding cave lies closer to him, the verbs reach him sooner. If he reaches the highest cave or makes enough wrong decisions, the game resets, displaying the score and current high and low scores. At this point, you (or a teacher or parent) can change the content of the game. You have four options in adjusting verbs from "to be" or "to have" to past participles, and can change word lists from easy to hard, the speed from slow to fast through nine levels, the duration from one to five minutes, and sound to silence, although I doubt the sounds would distract students in a classroom.

An Arcademic game, *Verb Viper* has the clever graphics and speed to appeal to students from elementary through junior high school, and perhaps beyond. You can use any of several keys or the paddle/joystick to fire. To learn concepts of tense and number rather than simple memory recognition, you need to use the documentation and worksheets supplied with the program, both of the same high quality typical of the Arcademic series. I found the inclusion of helping verbs in the columns marked Subjects on Worksheet #20 and the Content Option #4 rather curious, but the program itself does not include this error. I mention the mistake because, like other games in the series, *Verb Viper* is best used with adult supervision. The printed materials help teach, reinforce, and adjust the game to enable the player to improve his or her performance beyond the level attainable alone.

SEQUENCE—BLUE LEVEL EDITION

Learning Well
$49.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B+	*Value for Money*

Grades: 3½-5

Sequence is an educational game designed to teach logical subject development to students up to the fifth and sixth grades. Two players or teams select paragraph "cards" on a variety of subjects within a chosen topic. Each player or team chooses a paragraph and its placement on the screen based on a key word within each paragraph. The program will not allow incorrect placement. The player placing the fourth paragraph for a given topic gets the first turn at arranging the paragraphs in logical order. If correct, the player gets one point. If incorrect, the next player gets a chance. Cumulative scores appear on the screen or can be printed out at the end of each game.

The program contains six major subjects, each with nine subtopics, allowing for several hours of entertaining learning. Because several students or teams can play in rotation, *Sequence* well suits a school environment. The game is easy to use and well done, with effective but not blatant graphics, and contains few (and minor) errors.

WORDFINDER

CBS Software
$34.95
64K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	B-	*Value for Money*

Grades: 4 and Up

Wordfinder is a vocabulary-building game that teaches new words and presents alternative meanings to commonly known words. It also teaches spelling.

You are given a "keyword" from which you make "subordinate" words by combining the letters in a different way. New words must have three letters or more, but some keywords require a minimum of four or five. No abbreviations, slang, proper nouns, etc. may be used. You may choose to play with or without a time limit. Time is displayed and counted down on screen. If you type a wrong letter, backspacing erases it. If you hit any key other than a letter, the computer responds with, "Come on, try using letters," and waits five to ten seconds before taking any more input. This could be annoying for adults, but necessary for young children using the program.

After typing your subordinate word (if it is not a mundane word) you are asked to choose between four possible definitions. If you choose correctly, you are awarded bonus points.

One or two players can use *Wordfinder*. The two-player version adds to the enjoyment because of the competition involved. However, after each player's turn a bonus question is asked and the entire list of words redisplayed before the next player can take his turn. This becomes tiresome, especially if you have thought of a good word and are anxious to enter it.

As a game, *Wordfinder* can be a lot of fun for the whole family. As an educational tool, this program leaves something to be desired. The only new words you can learn must be taken from the review of subordinate words that follows the end of each game, or by guessing different combinations of letters from the keyword. The review shows an exhaustive list of possibilities, but during the game you can hardly type in a word you don't know. The program provides the meaning for any word on the list, and this is really the only feature that will expand your vocabulary. Learning from the list is easy enough, but it needs to be incorporated into the game itself. I did find my son studying the list in order to get an edge on me the next time we played. In essence, the competitive aspect fostered some learning incentive.

The documentation is very well done, offering playing hints, and some very useful information about words in general. Since *Wordfinder* runs on several systems, there are instructions, with sample display screens for each system. The screens are well-designed.

Despite the shortcomings, the program is enjoyable and challenging to your creativity as well as your memory.

ROOT WORDS AND SUFFIXES

Microcomputer Workshops Courseware
$39.95
48K; II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B	A-	*Value for Money*

Grades: 4-6

This program threads its way through a troublesome area of spelling. It teaches and tests how a root word changes when a suffix is added. In particular, it explains what happens to the final "y," the silent "e," and the final consonant of certain root words.

Ron Carran and Janice Ruotolo have constructed a tutorial that meets the high standards of Microcomputer Workshops' software. It features eye-directing screen design, teaching and quiz sections, helpful prompts and responses, and varied activity within each section. The program moves as fast as the student wants it to. He can go through instructions, a review of key terms, study of the rules with examples, or move directly to the exercise section, where he can do an exercise, take a quiz on one or all rules, or choose which spelling to use in sentences. In the exercise section, the rules are shown after certain incorrect answers. Even beginning with the study section is not tedious by any means, since the lessons are designed as quizzes, with the rule and an example appearing after a wrong answer.

Two kinds of problems are presented to vary the lessons: separating a root word from its suffix and then spelling the original root word, and connecting a root word to a suffix and making any necessary spelling changes. Complicated rules are broken down into parts for better comprehension. For a three-part, vowel/consonant rule, the student is encouraged to ask three questions, leading from recognition to the change necessary to combine the root with the suffix.

The documentation is complete and clear, but you won't even need it to get through the program. Personalized salutations, optional instructions, onscreen prompts, the highlighted key words, and a number of

different reinforcing responses make the program quite accessible. When the student completes the sections or decides to exit the program, an error summary lists all rules attempted, right and wrong answers, and offers a print option.

Within the scope of its subject, *Root Words and Suffixes* is both comprehensive and engaging.

WORD ATTACK!

Davidson & Associates
$49.95
64K; II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B-	*Value for Money*

Grades: 4-12

This vocabulary building program targets children in grades four through twelve. It includes a large word file, with more available. You can also design your own lists using the built-in editor. When you begin, you can choose to see a demonstration or proceed to the main program. You enter your name and specify whether you want sound and color (the letter size differs according to which you choose; you'd probably want color on a television and black and white on a monitor). You then choose a difficulty level from the nine available and pick your word list from the three offered at each level: adjectives, nouns, and verbs.

When ready to begin work, you can perform four different activities with the words. First, you can display the word, read its meaning, and see it used in a sentence. Second, you can take a multiple choice quiz. Third, you can complete sentences. Fourth, you can play an arcade-type game with attractive, though not outstanding, graphics. Best of all, you can create your own word lists with the Editor. The instructions for this easily used function are clear. The Editor enables you to make the program accessible to younger children or to those with learning or language difficulties.

Word Attack! only accesses one disk drive; it has no option for dual-drive systems. You can play the arcade game only with the keyboard; it has no option for a joystick. The program disk is copy-protected, but the company offers a generous one-year accidental damage warranty and provides backups for $10 each. This program is well-designed and adequately programmed, although not as polished as Davidson's other programs. I also think it is rather expensive.

CAPITALIZATION PLUS

Microcomputer Workshop
$44.95
48K; II/II+/IIe/IIc

Overall Rating	D+	C	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	C-	D	*Value for Money*

Grades: 4-9

Capitalization Plus covers thirty-eight capitalization rules and generates over 815,000 different sentences. You can study a rule, practice a rule, take a diagnostic test on a rule, or review a rule. Teachers can edit the lists to personalize them for classroom use. The program requires 48K of memory and a printer if you wish to print out records of students' progress.

Although I think the concept—drill and practice in the mechanics of capitalization—worthwhile, I don't think that the programming was thoroughly thought out. Educational software must be easy to use from the screen, not dependent upon reading the documentation. This program also lacks a personal touch. It doesn't ask you to sign on and then address you by name, nor does it allow you to choose how many problems to tackle. Doing so would add a personal touch, as would keeping track of the number of problems completed and the number right. The record of errors does not tell you the student's name nor does the information appear in a chart or graph clear enough for permanent record keeping. Worse, the instructions don't give specifications for the printer, leaving the student with inadequate information on how to prepare the printer for printing. If you choose to print but haven't hooked up or turned on the printer, the program freezes on the screen. Programming could easily rectify this by providing a statement instructing students that the printer choice only works with the printer attached and powered up. Another big weakness: there's no way to quit the program once you've begun. In addition, the program reinforces correct answers with excessive praise for simple exercises.

Despite the beneficial concept behind *Capitalization Plus*, I feel strongly that the programmers need to go back to the drawing board and try again.

WORD MASTER

DLM
$44.00
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 4-9

Like *Word Radar*, this Arcademic game features a circle of words which you must match with words supplied by the program until all are matched or the game resets. Whereas *Word Radar* involves matching the same words through an act of memory, *Word Master* requires you to match (fire at) synonyms, homonyms, antonyms, and a mixture of the three. The screen displays hits and misses as they occur, either at the end of the game, at set intervals (one to five minutes), or after three resets (at which point it also shows high and low games.)

You can begin to play after minimal instruction. To control the movement of a pointer and the fire simulation, you can choose from three sets of keys—for left-handed, right-handed, or two-handed play—or a paddle/joystick option (not recommended). Obviously, you need to know the concepts of homonym, synonym, and antonym to begin, but the different levels of difficulty for each concept make the game suitable for people with a wide range of abilities. You can choose one of three levels, or a fourth which combines them. You can also vary the speed of the game (1-9), the contents (three types of word matches and a fourth mixed option), the run time, and the sound (not too loud for classrooms). You can stop a game at any point. You can play against your own record or someone else's because the program records current highs and lows for a given session. The visual display works equally well in monochrome or color .

The program has some flaws in content. For example, some of the pairs seem mismatched with the level or each other. In synonyms, do "fair" and "just," "row" and "line" belong on the simplest level? Is "weight" really a synonym for "heavy" on level two, or did someone misspell "weighty"? Is it fair to offer both "dark" and "night" as antonyms for "day" in the same visual display? But these are exceptions to a carefully conceived program.

Word Master comes with a thorough manual for parents and teachers, with suggestions for teaching strategy, reinforcement of computer learning, and student drills and instructions other than those in the program.

WORD RADAR

DLM
$44.00
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A-	C+	*Value for Money*

Grades: 4-9

A word recognition game, *Word Radar* develops visual memory and discrimination skills. Though useful for people of any age, it primarily benefits elementary and slightly older students. The game asks you to locate words by "sweeping" the arrangement of boxes on the screen, revealing the words behind them, and shooting down as many as possible within a given time (adjustable from one to five minutes) or until the game has reset three times. Options let you choose the length of the game, the speed of the radar sweep (on a scale of one through nine), the level of difficulty (four, eight, or twelve words on each screen), and the word list (from shorter to longer words on a scale of one through nine).

The program features optional controls for keyboard use: ADW, JLI, and the left-right Arrow keys or space bar. You can use paddles, but I don't find them helpful. Color enhances the visual display, but a color monitor actually lessened the clarity; I found a monochrome screen much more satisfactory. The sound enhancement can be silenced, but I doubt the unobtrusive beeps would disrupt a classroom setting. I thought the manual helpful; and the support package with it contains word list masters and graphs for charting student performance and progress. Using the word lists as study sheets before playing the game can only help improve the player's word recognition and thus performance.

Teachers using *Word Radar* will want to watch out for reflex and eye fatigue in students playing the game. These quickly become a factor in their performance, but can be avoided by limiting play to ten or fifteen minute sessions maximum.

ENGLISH GRAMMAR, WORD FUNCTIONS

BrainBank, Inc.
$69.00
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 5 and up

English Grammar, Word Functions consists of nine lessons on two disks, focusing on homonyms, synonyms, antonyms, and troublesome words such as "to, too, two" and "its, it's." Well conceived and cleverly programmed, these lessons could enhance a language arts curriculum.

The documentation, as with other BrainBank programs, forms a weak link. One manual attempts to teach computer literacy, while the other gives a barebones view of the program and its possible integration into your curriculum. I expect more in terms of quantity *and* quality. You get no backup copies of the copy protected disks and no warranty information. (BrainBank plans to issue new policies in these areas, however.)

You can control sound, pace, and forward screen movement, but quitting the program or returning to an earlier screen prove awkward at best. After the tutorials you can take a quiz, but the program offers no provision for saving quiz scores—a disappointment to teachers.

These programs employ a combination of sound, graphics, text, games, and witty reinforcement for correct responses to introduce or review concepts pertinent to synonyms, antonyms, and homonyms. The vocabulary level suits upper elementary through adult students. If BrainBank adapts more realistic support policies, documentation aimed specifically at educators, and more user control of the programs, the overall rating would improve by at least half a letter grade.

EXTRA! EXTRA!

Media Materials, Inc.
$39.95
48K; II/II+/IIe

Overall Rating	B	B-	*Reliability*
Ease of Use	B+	A-	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 5-9

Imagine yourself a Cub, Staff, or Ace Reporter, charged with getting the essential facts concerning a particular news event within a set period of time. You have several teletype messages at your disposal, plus a list of names and phone numbers from which you can select likely sources of information (with no guarantee that anyone will answer). While the clock counts down, you must determine the following: Who did it? What happened (verb)? When did it happen? Where did it happen? Why or How did it happen? When (if) you get all the facts, you submit your story to the editor. If your facts are correct and specific enough, and you have not run out of time, your story will appear with your name on the by-line; if not, you will be told which questions(s) has not been answered and given an opportunity to correct your story within the time left.

This well-designed simulation extends its benefits beyond journalism to critical reading and analysis, skills emphasized in the upper elementary grades. The difference between the three skill levels is a matter of time (from twenty-five to fifteen minutes), corrective prompts, and difficulty of securing information (more use of the telephone at higher levels).

You must pare the information down to no more than three words—the most specific words, at that. For instance, "sentenced to prison" is judged correct, whereas "was sentenced" is not. Sometimes the acceptable notes may seem quite elliptical. For example, in one story as explosion resulted from "a mistake by one of our chemists." which would not be correct in a story. In the story derived from acceptable notes, however, you add and fill out sentences to produce the first paragraph of a new story, with your name in the byline. A major shortcoming in the submission process, however, occurs when you submit incorrect notes. You are told which note(s) is incorrect, but if time runs out before you can choose the correct information, the program will not tell you the correct note.

The on-disk instructions are clear, but the complexity of the program necessitates reference to the documentation during the first run-throughs. The program itself is relatively error-free, although I was able to elicit both a quantity error (29346) and a syntax error (35616) in one game.

THE VOCABULARY GAME (Junior Level)

J & S Software
$29.50
48K; II/II+/IIe/III in emulation

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	B	*Value for Money*

Grades: 5-9

The Vocabulary Game (Junior Level) is a menu-driven vocabulary tutor centered around baseball. It displays equally well in color or monochrome, but since it has little color, you might prefer a monochrome display. It suits elementary to junior high school students, while a major league version (senior level) suits high school, college, and adult players.

The game asks you to define words by answering multiple choice questions, rewarding correct answers with a hit. One wrong answer and you're out. You can set the level of the words from easy, hard, and very hard words, or combination play in games of either one inning (three outs) or three innings (nine outs). An easy word scores a single, a hard word a double, and a very hard word, a triple. In the combination mode you choose which kind of hit you want to try for and the program asks an appropriate question. If you get the question right, the screen shows a baseball diamond and a little batter running the bases. It also displays the score, the number of outs, and the inning number.

The game seems to work best as a combination game with several youngsters playing together because competitors provide some excitement. *The Vocabulary Game* needs more sound effects and a real, head to head baseball game to compete with arcade games. Its scholarly aspects are admirable on the whole, but some of the archaic expressions better suit the Senior Level.

A password allows teachers and parents to modify the database by deleting names, high scores, words, or meanings, or adding word lists. You can list all the words in each category either to the terminal or a printer. To change a word or its meaning, you must know its number, which forces you to print out the list. The password system has problems, too. The password information and all Teacher Options are in the same small four page manual as the Student Instructions, which makes password secrecy a joke. Otherwise, the manual adequately explains the game's mechanics.

In sum, I found this an enjoyable although not spectacular program, offering a good, varied vocabulary for study. The disk is copy-protected and a backup copy costs an additional $10.

SUBJECT-VERB AGREEMENT

Microcomputer Workshops
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

Grades: 6 and up

This program tackles a crucial language arts area in thorough fashion. No graphics, or sound effects entice the student; instead, authors Doug Higgins, Pat Brzozowski, and Joseph Stampleman have packed the disk with rules governing subject-verb agreement, exercises, a diagnostic test, and analysis of the results. The documentation boasts that there is data sufficient to compose "literally billions" of grammatical (though not necessarily sensible) problem sentences. In addition, the teacher can insert students' names and local place names to spice things up.

A student can begin in several ways: with essential distinctions between singular and plural verbs, with any of the more specialized rules, with exercises keyed to one or more rules, or with a diagnostic test. Once a rule is chosen, it is stated and the student is given a chance to move to another activity. If he decides to study the rule further, an example is given, with verb, subject(s), and explanation displayed. More examples are available on request, or the student can attempt to correct a problem, which involves highlighting the incorrect verb or auxiliary verb and the subject, and then typing in the correct form of the verb in the present tense. When you highlight the wrong word, you glimpse the thoroughness of this program. Not only are you politely told that you have made a mistake, but you also are given the function of the wrong word in the sentence, and an encouraging hint. Errors in the exercises are corrected immediately; when you finish, you can opt to see a screen or printed analysis of your errors.

There are a few annoying things about this program. If you correct the number of a verb and switch tense ("was" instead of "is"), you are simply told the answer is incorrect, even though the sentence is still grammatically correct. An explanation of tense might help here. "N" means "No" on one screen and "Next" on a subsequent screen. (Why not Return for "Next?") Finally, you cannot compress the spacing of the analysis printout to save paper.

But these are minor inconveniences in a program that is complete, and varied enough for repeated use.

VOCABULARY ADVENTURE I

Queue Intellectual Software
$39.95
48K; II/II+/IIe

Overall Rating	A	A-	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

Grades: 6-8

Challenging young students to learn new words is the objective of *Vocabluary Adventure I*, subtitled The Castle of Treasures. Over 1000 new words are introduced throughout this adventure game, not only in the questions and puzzles which must be solved to earn points, but also in the directions, room descriptions, and hints. It teaches new words through repeated exposure to them in context, rather than through drill and practice.

Individual students or groups begin the game at an entry passage and travel through a castle. The object of the game is to visit each of the fifty rooms and pick up treasures. In each room vocabulary challenges get harder and harder, but treasure point values increase, too. After correctly answering four vocabulary questions, the student earns points (from ten to forty) and then goes to a passageway. In the passageway, the former occupant of the next room is described. If the student can identify him, the door opens and he earns 100 points. If not, a different door opens; the student receives no points and cannot go back to the room he missed.

The program frequently uses synonyms and/or antonyms to illustrate the meaning of the vocabulary words. Hints are offered which are amusing and also reinforce word meaning. Other hints are mnemonic devices which make the words easier to remember. Point value for a question is halved when a hint is used.

Time required varies from twenty minutes to two hours, depending on the ability of the players. Students unable to complete the game may quit and restart the game at a later time. Up to seventy-five student names and places may be saved. The top forty scores are automatically recorded in the Hall of Fame, which is displayed at the end of a game. The teacher can delete some or all student names to clear the files.

Answers are automatically accepted by the computer. The Return key is used only after the computer responds to student answers. However, if the student hits Return after his answer, he won't see the computer's response or any hints.

The documentation provides a list of fifty words used in the passageways. Other words used were selected from frequency lists compiled from different sources and collected in *Teacher's Work Book of 30,000 Words* by Edward L. Thornedike and Irving Lorge.

Intellectual Software provides a toll free number for any user needing assistance. The company will replace damaged disks for $3.

Although *Vocabulary Adventure 1* is designed for middle school students, I found it challenging for both students and adults.

VOCABULARY ADVENTURE II: THE LABYRINTH

Queue Intellectual Software
$49.95
48K; II+/IIe/IIc

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A	A-	*Value for Money*

Grades: 6-8

Improving vocabulary skills for everyday use as well as for intelligence and aptitude tests is the objective of *Vocabulary Adventure II: The Labyrinth*. The program presents a story adventure which leads the student through an intricate, non-graphic maze. Over 100 words are introduced through exposure in context rather than drill on the two game disks. Aimed at sixth to eighth grade students, it is challenging for older students and adults, too.

The player's goal is to explore all the rooms and passageways in the maze. Each area presents three multiple choice vocabulary questions describing the location and the creature that lives there. These questions are worth 50, 100, and 150 points, respectively. They become increasingly difficult as the student progresses. Hints are offered, but if the student uses them the point value of the question is halved. Players may refer to the hints and questions as often as they like before choosing the answer. If they answer incorrectly the definition is displayed. When all the questions in a room are answered, the player's total points are displayed.

Between the rooms, passageways present descriptions of the inhabitants of the next room and a choice of five names for them. These are among the hardest words in the program, so the student receives 200 points for answering correctly. No hints are available for movement in passageways, and if the player is wrong he does not gain access to that room—a new door is presented. A list of the fifty words used in the passageways appears in the documentation. Other

words selected for this program, for the most part, are from various frequency lists and collected in *Teacher's Word Book of 30,000 Words* by Edward L. Thorndike and Irving Lorge, published by Teacher's College, Columbia University.

The top forty scores are automatically recorded in the rotating file Hall of Fame, which is displayed at the end of the game. Playing takes from two to three hours, so the program holds seventy-five saved games. Each holds a student's position in the maze and his score, and may be called up when the student wants to continue playing. The teacher can clear student names in the Hall of Fame and saved games individually or *en masse*.

The program automatically accepts answers; the Return key is used only after the computer responds to answers. If the student hits Return after entering an answer, he will not see the computer's response. At the proper time, the student is prompted to change disks.

The documentation is for both the Apple and the Macintosh versions. It includes a toll free number for problems or questions. Intellectual Software will replace damaged disks for a $3 fee. All their software comes with a thirty-day return privilege, and they offer one free program with each $200 purchase.

Sixth grade students at my school like the challenge this program offers. While they are often unsure of word definitions, their vocabulary skills are improving.

3 IN 1: WORD RESCUE/ MATH-MANIA/ FOREIGN FRENZY

Stardust Software
$40 (or $25 for each if purchased separately)
48K

Overall Rating	C+	B-	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	B	C	*Value for Money*

Grades: 6-9

With *3 in 1*, Stardust Software seems to be offering the software-buying public a comprehensive educational package that appeals to a wide range of students with diverse interests and skill levels.

All three programs come on one disk, plus an additional data disk is provided for storing user-generated optional levels of the drills. The package also contains user guides which are sufficient. Each program employs an arcade format for drill exercises; practice is available for spelling, basic arithmetic, and vocabulary in Spanish and French. Though the educational value of the three programs is questionable, it is, interestingly, the primitiveness of the arcade format that will leave the majority of user's cold, and is most likely what will be perceived as the product's biggest drawback. The spaceship firings seem to serve little purpose, and I found them very distracting.

Least palatable of the programs is *Word Rescue*, in which the screen displays three words. The student must then look at the words; pick one to spell, type 1, 2, or 3 to position the attack ship, hit the space bar to blank the words, then correctly type the chosen word. If the word is typed in correctly, the ship fires a missile into the the box and an exploding sound is heard. Success results in the program's presentation of a set of three new words for the player's consideration.

Several options are available. The user may choose from ten levels, or he may create a level of his own and enter it on the accompanying data disk. The student may also choose a variable time in which to correctly answer the "question." Points are awarded for right answers and subtracted for incorrect ones, "time up," and "hints." The player wins by accumulating 100 points. Control keys allow a choice of sound or no sound and may provide some help with the answers, if needed.

The problems I've encountered with this package include a lack of range in ready-made word groupings, lack of visual appeal, and lack of flexibility in entering answers. Responses must be typed in slowly, and one has no chance to correct accidental errors or entries that are misread by the program. Typographical errors elicit an immediate negative response from the program and a clearing of the screen. Phooey.

Foreign Frenzy operates in almost exactly the same way as *Word Rescue*, except that you're given a choice of languages: Spanish or French. Also, there are considerably more levels from which to choose (these levels are not delineated according to difficulty, but are subsets of vocabulary—including, for instance, kitchen and garden terms, weather/seasons, and parts of the body). The screen presents three words: one or two in the chosen language, the other one(s) in English. The player selects the one he wants to translate, positions the spaceship, hits the space bar, then types the correct translation for the word (i.e., he would type "lemons" for "los limones" or "el Pollo" for "chicken").

The method of scoring is the same as in *Word Rescue*, hence the same problems regarding answer entry crop up.

Math Mania is slightly different in format from the previous two programs. You may choose level and allotted time, and since each screen displays a separate problem involving addition, subtraction, multiplication, and division, the student may choose to practice

on one particular arithmetic operation or a combination thereof. The attack spaceship is in the center, and the user points to whichever problem he wishes to tackle. He then types in the correct numerical response in order to "launch a missile" at the problem.

Correct answers earn fifteen points, incorrect ones result in a penalty of minus five. Deductions are made for "time up" and "hints." A score of 150 wins; a score of minus twenty-five loses. In addition to the difficulties one encounters when entering answers during *Word Rescue* and *Foreign Frenzy*, one other difficulty arises here. Since some of the upper level problems (four-column figures) involve carrying or borrowing, typing in numerical answers from left to right is particularly troublesome. Unfortunately, there's the danger here of creating a highly frustrating situation. This frustration may actually lead to a deterioration—rather than a development—of skills in number operation.

The reasonable price of the *3 in 1* package is certainly an attractive feature. For the user who is willing to access the optional level generators and endure the inanity of the arcade game format, the package may even be a bargain. However, the serious—and patient—educational software consumer should look elsewhere for programs that are more user-friendly and, most importantly, instructionally sound.

INTRODUCTION TO POETRY: POETIC METER

Peachtree Software
$29.95
48K; II+/IIe
Any BASIC firmware cards in the II+ must be removed

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

Grades: 7 and up

M. David Merrill's tutorial/test offers a very appealing way for students to grasp the distinction between poetry and prose, as well as the concepts of stress, metric foot, and scansion. In addition, the teacher or parent may add other examples of words or verses to be used in the program's examples or practice.

Concentrating on the rhythmic aspects of poetry, the tutorial uses a well-designed process of pre-test, example, review, and test, with an array of reinforcing textural prompts, screen layouts, and unobtrusive repetition. Errors are not penalized by squawks or graphically-depicted destructions, an important plus when teaching a subject that has so many widespread misconceptions associated with it. *Poetic Meter* creates a very positive learning environment, interactive without sacrificing content, tolerant with safeguards against the student who wants to "Return" his way through as quickly as he possibly can. I particularly like the "Danger" and "Stop" signs that counsel more study or review, which can be facilitated easily by turning back via the arrow keys.

Of particular note is the clever use of tones (sounds) to help the student hear the difference between stressed and unstressed syllables. This feature teaches syllable separation and differentiation so well that teachers who emphasize the importance of these skills in connection with spelling and/or vocabulary study may want to run the Word Introduction, Word Example, and Word Practice sections separately from the whole program. (This can easily be accomplished by using the initial menu display.)

A second disk offers the opportunity to write in new material, which can then be used with the tutorial disk. An adequate editing program enables you to modify, create, or transfer files. You can, for instance, create as many as three new files of up to twenty-six, four-line verse examples—enough to contain a number of short poems for the practice segment of the tutorial. The student may then be instructed to identify the type of meter or to do a more detailed analysis, which subsequently will be checked against the teacher's analysis. The program does not allow duplication of tutorial disks, though.

A very thorough, illustrated booklet guides you through the steps of authoring. Peachtree offers registration, technical assistance, and a ninety-day replacement warranty, after which they charge a minimal fee of $5.00 plus mailing costs for a replacement. In addition, owners of *Introduction to Poetry: Poetic Meter* will be offered improved versions of the program at a "special upgrade price."

RAPID READER

Advanced Logic Systems
$39.95
48K; II/II+/IIe/IIc

Overall Rating	D	C	*Reliability*
Ease of Use	C+	C	*Error Handling*
Documentation	D	D	*Value for Money*

Grades: 7 and up

A menu-driven program, *Rapid Reader* claims to provide training in speed-reading of English or optional foreign language words, phrases, and short sentences. Exercises vary from reading single words to supplying a missing word in a sentence. Speed ranges from less than a hundred words per minute to 2,000 words per minute, and you can introduce some flexibility in vocabulary. Unfortunately, like other programs that claim to do the same thing, *Rapid Reader* confuses reading with word recall—an ability that has nothing to do with comprehension. This, combined with other weaknesses, makes *Rapid Reader* a poor choice for anyone who wants to use a computer to build language skills.

The two parts of the program provide practice in word recognition and offer speed tests and options for changing the word banks. In the first part, you can choose word, word pair, phrase, short sentence (four words), and long sentence options and the speed at which they flash on the screen. Once going, each subprogram continues to flash options indefinitely. Supposedly, the reader learns to recognize words and word groups, but the program offers no reinforcement. You can alter the speed by use of directional arrows. In the speed test, you choose a speed (from 50-2,500 wpm) and a level of difficulty. A sentence flashes on the screen, then reappears with a word or phrase missing which you must supply. The use of all capital letters hinders word recognition, and at speeds above 500 wpm, the sentence is little more than a blur appearing at random locations on the screen. Reading under these conditions becomes absurd. In addition, sentences are often nonsensical, such as "The hungry elephant walked loudly" or "Just as the bad teacher worked calmly for a dollar, he complained." Even if you guess correctly you receive no reinforcement or summary of right and wrong answers.

You can change word banks. The program includes a default English and Spanish word bank and three user-modifiable banks. Each consists of nine word groups of fourteen words each; word groups generally include similar grammatical parts to ensure some structural sense in the randomly generated sentences.

Although *Rapid Reader* claims to help you learn to read or speak a foreign language, no oral skills are involved. Two people could read aloud words or phrases from the screen, but a printed text would certainly work as well. Since the program includes no support texts, you will have to look elsewhere for such help.

THE WRITING SKILLS SERIES Volumes 1-5

Peachtree Software
$39.95 (each)
64K; II/II+/IIe

Overall Rating	C+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	C-	*Value for Money*

Grades: 7 and up

Writing Skills is a series of five separate, two-disk packages which drills students in the basics of sound English usage. Its authors advise that it does not purport to teach a complete course in English, but rather helps correct persistent usage errors which afflict writers of nearly all ages.

The programs are straightforward in format, and the unique, seven-key text editor is thoughtfully constructed for ease of use. The lessons tend to run a little slowly, but this is a minor matter. The five programs are identical except for the grammatical material to be practiced. Volume I presents possessives/contractions, noun plurals/possessives, and subject-verb agreement. Volume II has pronoun-antecedent agreement, commas, and sentence fragments. Volume III explores quotation practice, pronoun cases, and subject-verb agreement/number. Volume IV drills pronoun-antecedent agreement, troublesome modifiers, and subject-verb agreement/number. Finally, Volume V has pronoun-antecedent agreement, problems of case, and consistency.

Some topics are duplicated in different volumes, but they differ as to application. For example, subject-verb agreement/number in Volume III deals with subject-verb separation and inverted order, whereas in Volume IV, the practice involves usage with indefinite pronouns and usage with "there" or "here."

At the outset, you take a pretest by editing several passages of written material to determine where your weaknesses lie. The program scans your work, then tells you where study is needed. The main menu, which is also an evaluation menu, lists the various topic areas along with a progress report. This cumulative record relies on all tests and text practices in the program for its running evaluation.

In the drills, you are presented with an example and practice questions. You learn to identify a common writing error and a rule, principle, or technique aimed at avoiding its repetition. This is followed by an extended prose passage (which scrolls) containing the same kind of error. You correct the passage with the text editor. This editor is bare-bones, but adequate. Pressing "E" gives you a word-by-word evaluation of the passage with an explanation of where you have succeeded or failed.

After scoring the required ninety percent or better on a lesson, you take a topic test. Each volume also has a comprehensive post-test consisting of several sets of long passages containing the type of errors studied in the previous lessons.

One of the most interesting and useful features of *Writing Skills* is that the programs can create a random selection of errors in the text exercises. You may correct the same passage more than once, but with different errors each time. The program is also aware that you may create errors where none existed, and this information is skillfully used to guide you to areas you need to practice.

Writing Skills includes a learning manager with which a teacher can track the progress of up to forty students. The save and erase functions for record keeping work very well and the manager, overall, is easy to use.

With the packages retailing at $39.95 each, there is the problem of cost. To learn your "its" from "it's" and "their" from "there," you'll have to spend $200. For schools, the expense may be justified, otherwise, there are cheaper ways to polish up your English.

WORD PAIRS

Microcomputer Workshops Courseware
$39.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 7-12

Although this program is written for grades seven to twelve, it could be useful for anyone wanting to correct common word-use confusions, such as "affect/effect," caused by sound (homonym) or spelling similarities. The heart of *Word Pair,* by Jonathan Paul and Elaine DelVecchio, is a list of fifty-three pairs of words, sequenced in order of difficulty. The program can function as a complete tutorial for vocabulary and spelling or as an aid to clearing up problems with selected pairs of words.

The student can begin with either the Teaching section or the Exercise section. It is recommended that students go through the Teaching section first, but the information on a given word pair is also shown in the Exercise section if the student makes a mistake. Students who want to limit the material to certain word pairs can only do so in the Teaching section; the Exercise section generates its problem sentences randomly from the whole list.

Accessibility and lesson design meet the high standards I have come to expect of Microcomputer Workshops' software. A complete set of instructions (optional) on disk supplements the clear documentation. In the Teaching section, the student is presented with multiple definitions of each word, a sample sentence, and an opportunity to try some fill-in-the-blank sentence problems. In the Exercise section, the order is reversed, with the definitions and sample sentence left as an option for the student who answers the problem correctly. In either case, the student can go through the lesson or exercise again, with a different example or problem sentence. This is a very nice feature for the student who wants more practice or another sentence to clarify the distinction.

The screen is attractively laid out, with a border, a heading, and the attention-getting salutation (personalized), announcement, or problem in the upper half. Inset definitions or answer choices are in the bottom half, with option prompts set just above the bottom border. Key words in sentences, certain responses, and prompts are displayed in black against a light background.

Unlike many educational programs, *Word Pairs* acquires personality through use of the first person to refer to itself and catchy encouragements after responses and between lessons or exercises. Such lines as "I enjoy your being right," and "To the end!" help the student through the program. I especially like the extra hints, such as the one suggesting that the student associate "piece" with "pie" to avoid confusing it with "peace." The student may exit a section at any time, and an analysis screen shows pairs attempted, number correct or incorrect, and lists "pairs you know" (for which you must have a minimum of two correct problems) and "pairs to study." This screen may be printed out.

PUNCTUATION AND STYLE

Oasis Systems
$125.00
60K; II

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C-	*Value for Money*

Grades: 9 and up

Punctuation and Style bills itself as "Punctuation Checking and Writing Improvement Software." Certainly it checks some kinds of punctuation errors—whether or not it improves writing lies in your hands. The program assumes that you use *WordStar* as your word processor, but it comes with predefined option files for *Magic Wand*, *SpellBinder*, and *Perfect Writer*, and you can configure it to work with any other word processor. Operating the program turns out to be quite simple, although the manual offers little help in explaining it. You must be very familiar with both your word processor and CP/M operating system to install *Punctuation and Style* successfully.

The program divides into two sections. Cleanup reads and marks your text for capitalization and the following mechanical punctuation errors: a space before a punctuation mark, an odd mixture of upper- and lowercase letters, a repeated word, a sentence beginning without a capital letter, a sentence ending without a punctuation mark, punctuation outside quotation marks, and marks that belong in pairs, such as quotation marks, parentheses, brackets, and braces. Correcting these surface errors doesn't produce good writing, but it takes the drudgery out of searching a manuscript for such embarrassing mistakes.

Phrase gets closer to the heart of bad writing. It resembles a search and destroy (if you choose) system. It marks phrases considered awkward, erroneous, folksy, muddy, pompous, redundant, wordy, or a cliche, and looks for passive constructions. For example, consider "Last but not least, Punctuation and Style is nice as a method of helping the writer to minimize as far as possible distracting errors." The Phrase mode marks with bracket the phrase "Last but not least." The manual tells you that it's a cliche. The program brackets the word "nice," explaining that you should use a more exact word. It brackets "as a method of" and suggests "for." It brackets "minimize as far as possible" and suggests the simpler "minimize." You are free to make the suggested changes or ignore them. Here, the final sentence might become, "Finally, Punctuation and Style is useful for helping writers minimize distracting errors."

SUPER SPEED READING

Magnum Software
$99.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 9 and up

Super Speed Reading is an instructional program designed to increase the average reader's speed from two to ten times. An attractively packaged and self-contained course, the program consists of a blue program disk and a green practice disk. The lessons on the blue disk include a test of reading speed, principles of speed-reading, and techniques for faster reading of school texts, business material, and computer programs. The lessons are well written and illustrated with excellent graphics. For example, a lesson on pacing your reading with a pencil not only explains the technique, but demonstrates it on screen with a very realistic pencil.

Super Speed Reading has also taken care of that bane of all reading classes and programs: keeping track of progress. The program does it for you. It also provides bar charts of your last fifteen lessons. It can even keep track of books you read on your own.

After booting the blue disk you may begin by just browsing. The choices made will determine the order of lessons or practice. Even browsing can teach you a lot, allowing you to try out each of the lessons or simply practice specific features.

The amazing part of this program is the sheer amount of text on the two disks. The green disk, for example, contains 120 pages of practice text, some phrase reading practice, and charting programs. All text is in upper- and lowercase, the letters being about the size type encountered in most books and magazines. To assist you in using the practice material, an adjustable pacer is provided for word grouping and a built-in metronome to build rhythm in reading. Reading speed for exercises varies from 100 to 3,000 words per minute.

The documentation contains the text of the lessons and some additional practice samples. This program focuses less on comprehension than speed, assuming that better comprehension comes with increased speed. However, it does include some comprehension practice.

The producers of this program stress that you must read regularly to become a better reader. Thus the program emphasizes consistent reading practice. This may discourage those people looking for that quicky ten minute course that will teach them to read 2,000

words per minute. Nonetheless, the principles of this program are sound. For those willing to work with it, *Super Speed Reading* ranks among the best speed-reading programs on the market.

WRITING WITH A MICRO

Sterling Swift Publishing Co.
$59.95
48K; IIe with 80-column board

Overall Rating	B-	A	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	B	X	*Value for Money*

Grades: 9-Adult

Have you ever heard of a cinquain? A triolet? A short story? Most of us have heard of the last one; the first two will be familiar to students of poetry. But don't worry, *Writing with a Micro* is here to help you write all three. The subtitle of this program, Before Word Processing and Beyond, is apt because the word processing is primitive, and it certainly goes beyond anything that a word processor would ever consider attempting.

Intended to be an educational program, it can also be fun—occasionally. There are three parts to the program: the cinquain (a five-line form of poetry), the triolet (a complex eight-line form), and the short story. First you choose the form you wish to study. There are two kinds of cinquain, noun to noun or syllable pattern; and there are two kinds of triolet, A A A A A A A A or A B A A A B A B. Then you choose how many words, phrases, or sentences to enter for each part of the form. You enter those words and, in appropriate cases, the specific rhyme or syllable patterns. For a short story, you enter such things as setting, character, conflict, climax, and resolution. The program takes the various parts and randomly creates a poem or story from them.

You can print out the completed creation, edit it, create another, or save the data on disk. If you wish, the computer will keep creating works of dubious artistic merit and print them out. The program cannot comprehend content. It creates entirely at random, except that specified parts of a form are always in their proper places.

The forty-two page manual contains a full explanation of the forms. The information provided is excellent, and the examples are mostly very good. However, although the manual is clearly written, it contains several obvious grammatical errors, and the style is excessively dry.

Once the data has been entered, you cannot revise it. If you make a typing error, you have to live with it, or correct it on a case by case basis when the poems or stories are generated. There are even some typos in the sample program on the disk. There should be an opportunity to re-check the lines before saving them to disk. If you catch a mistake before hitting Return, your only option is to backspace to the mistake and retype the entire line from there. There is no insert feature. You can't put a comma in a line unless you enclose the line in quotation marks. The program truncates a line at a comma if there are no quotes. This system is cumbersome and unforgiving (truly before word processing).

This program will function well in some settings, despite its limitations. It could be an excellent classroom tool. With the whole class making up the various elements of a story or poem, the results could be very interesting, and maybe even artful. For serious writers who wish to create refreshingly illogical poetry, this would also be a fine program. It works best as a poetry generator, however. The requirements of a good story are more stringent with respect to consistency of plot.

Perhaps the best way to give you an idea of the capability of this program is to quote a cinquain it "wrote:"

Unfair
Alone in the dark
Don't ever laugh or cry
It's too bad, is all they could say
Oh God

BEGINNING COMPOSITION

Behavioral Engineering
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	B+	C	*Value for Money*

Grades: 10+

Beginning Composition promises to teach you to "develop and use your senses to compose and write essays, stories, letters and other written material." It consists of an extensive prewriting program, a first draft program, and a primitive word processing program. The latter includes some editing, printing, and file conversion features.

A number of assumptions of "Neuro-Linguistic Programming" underlie the prewriting program. They boil down to a prior assumption that people organize experience according to their senses and the feelings

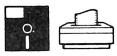
that arise as a result. Involuntary eye movements accompany specific memories or thoughts, such as upper right or left for visualization. In the different stages of the prewriting program, you imaginatively visualize, hear, or feel experiences or aspects of your subject in relation to your own mind and the minds of a potential audience. The arrows with each stage suggest moving your eyes to a point offscreen determined by the sense level you seek. By consciously duplicating the physical manifestation of thought or memory, you're supposed to think or remember better. Finally, you talk to yourself about the subject, attentive to the words you might use to elicit the desired responses from the audience, and to the words that another person might use in talking about the same topic.

Whether or not you agree that conscious movement of the eyes will help you think about a subject, any program that gets you to think about aspects of a topic and potential audience responses has something going for it. I wish, however, that the program would release you to let you type in the words, phrases, or scenes that this exercise has summoned. Then you could group images and thoughts and build them into a story or essay. Instead, the program moves into sentence combination as a way to build paragraphs. You generate a sentence, then one that builds on the first. As you enter clauses, each becomes a new sentence and generates the stem for the next sentence. You then decide when you have enough sentences for a paragraph. You can generate another paragraph in a similar fashion, or save the paragraph on the program disk or a file disk and exit. When you save the composition, the program drops the connectives that helped you build the sentences.

Such sentence-by-sentence composition assumes that you can verbalize and organize the random thoughts of prewriting via simple syntactic commands. Some writers may need continuous prodding, but it does not lead to unified paragraphs that make up a whole. Sentences can lead to sentences without ever developing a main subject. At the beginning level especially, where the program selects the connectives you use, you are likely to end up with rough notes rather than a finished composition. Nothing suggests that you shift the second paragraph to focus on aspects or events different than those featured in the first paragraph.

The editor includes character and block cursor movement, simple deletion, and type-over (insertion). For more sophisticated editing, you can convert the file to accept *Apple Writer* editing. The program also allows you to add to, delete, or print a file.

Beginning Composition seems most valuable as a prewriting tool to move you toward independent thoughts, sentences, and possibly even a coherent paragraph about a topic. Once you've achieved a breakthrough, however, the tutorial should stand aside and let you write. At this stage, you need a word processing program, if anything.



SPEED READER II

Davidson & Associates
$69.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 11+

Speed Reader II helps you read faster. It displays the material, times you, and then tests you. The demonstration provides all the instruction you need to operate *Speed Reader II*, but the program prompts you from time to time to read the documentation, which contains supplementary materials.

Each time you load the program, you must perform a small amount of configuration. You specify sound or no sound, one or two disk drives, and a regular or bold display of the attractive print. (Bold print shows up better on a color monitor or television set.) The display shows upper- and lowercase without an adapter. Now you can make choices from the menu. The program offers warm-up, eye movement, column reading, passage reading, and timed reading exercises. It chooses the words for the initial exercises at random; you pick the passages for the others from a reasonably large selection on the data disk (one data disk comes with the program). You can buy other data disks for $19.95 each, geared to different reading levels, or create your own. The timed reading exercise lets you see exactly how many words per minute you read. You can work at each exercise for as long as you wish, then switch to any other one. The Return key takes you back to the menu at almost any point. The manual recommends that you work no longer than twenty to thirty minutes at a stretch. At the end of each exercise, you can take or skip a quiz on your comprehension of the material you just read.

Speed Reader II provides a function called the Editor to let you write your own passages. I thought the entire program well crafted, but this portion is outstanding. It includes a mini-word processing program which allows you to delete and insert lines. While not as extensive as a true editor, it more than meets your needs here. Again, you barely need the manual, because you can call up explanations of the commands. After enter-

ing material, you can write your own questions for the quiz. The program then analyzes your paragraph and determines the grade level of the material (apparently by analyzing the number of sentences and syllables per one hundred words). When I entered a paragraph from a law book, the program rated it for grade 14 (second year of college), which seemed about right.

Obviously, the Editor suits this program to the classroom as well as the home. You can create as many data disks as you wish, for levels from first grade through adult. My only criticism is that the Editor won't let you put in words for the warm-up exercises as well. Some of the words seem a bit difficult for children, but you could have them use the letter warm-ups instead.

The instructions included with this attractive package are crystal clear, even down to telling you how to initialize a new data disk. The manual itself actually teaches you how to read faster. It provides a ten-part lesson outline, plus charts to record your progress. The manual also includes extra blank charts. A professional educator designed the program and a professional programmer programmed it, yielding a combination of valuable content and smooth execution. Teachers should note that the National Education Association has teacher-certified *Speed Reader II*.

The program disk is copy-protected, but you can obtain a backup copy for $10. The company offers a one-year warranty for any accidental damage to the disk. The manual provides a phone number for customer service (which I didn't need, since everything worked perfectly).

Speed Reader II provides an excellent example of a reasonably priced, well executed, and useful program, that's well worth the cost.

SPEEDREAD+

Inet Corporation
$64.95
48K; II/IIe/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A-	*Value for Money*

Grades: 11 and up

Here's a speedreading program based on proven scientific principles. *Speedread+* turns your computer into a tachistoscope—an instrument capable of flashing words and phrases before your eyes. A simple menu lets you independently set the flash rate, phrase width, phrase location, and number of lines of text presented. Once you have set the parameters, the program does all the work. You need not block out text or finger scan. You even get provisions for altering flash rate and phrase width while the program is running. *Speedread+* offers an excellent example of how technology can make learning more efficient by reducing the amount of time and energy required for learning support.

The excellent documentation clearly and concisely communicates not only how to operate the program, but equally important, how to set up effective learning schedules. Important cues to identifying and correcting poor reading habits are not only well documented, they're actually built into the program. For example, by varying the location where phrases appear on the screen, you receive training in extending your peripheral vision—an asset in reading as well as other perceptual tasks.

Despite a couple of weak points (all phrases in upper case and lack of adequate explanation for the provision to incorporate additional text), this program provides an excellent way for readers at any level to painlessly improve the speed and comprehension of their reading. Since the program requires only about five minutes a day, it looks like a particularly cost effective investment for schools.

MICROSPEEDREAD

CBS Software
$125.00
48K; II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 12 and up

MicroSpeedRead differs from many current speed reading programs in that it emphasizes reading as a process of understanding the meaning of the text rather than as a mechanical training exercise for the eyes. The program tries to help you double, triple, or quadruple your reading speed, recognizing that reading rates differ according to purpose and difficulty of the text. The stated goal refers primarily to novels and light reading. Pre- and post-tests of your reading ability help you determine your present level and thus the extent of your final progress.

Reading strategies taught by the program include idea clustering; soft-focusing (reading by word groups); pacing methods such as single- and double-line pacing, "S" and "Z" pacing; and other rapid reading methods.

The appendices include a glossary of reading terms and methods of determining the readability (usually expressed by grade level) of magazines, business correspondence, and other materials that you may encounter.

The four disks include a total of ten lessons. (Don't throw away disk 1 after you finish lessons 1 and 2, because it also holds lessons 9 and 10.) The program is otherwise very well organized. It clearly demonstrates speed reading techniques and immediately gives you a chance to practice. A comprehension test follows each lesson. Of course, a good test taker can do well on these tests with only a cursory reading of the material, but after all, a good vocabulary, prior knowledge of subject matter, and difficulty of material influence comprehension also.

The authors feel that you don't have to read every single word in order to understand what you read. They prove this theory with several intriguing exercises that leave out letters and entire words.

The manual furnished with the program is not merely a user's handbook, but an integral part of the lessons. You practice your reading techniques on the screen and follow that up by reading selections in the manual. This is very important because of the definite differences between reading material on the screen and in a book. The program even times you as you read in the book and calculates a reading speed. You can track your daily progress in the manual and also by means of graphic progress indicators in the program.

Community college instructors designed *MicroSpeed-Read*, which parallels similar courses taught at that level. The articles used for practice have an average readability appropriate to the twelfth grade. Subsequently, this means it is not the best choice for people with reading difficulties.

VOCABULARY CHALLENGE

Learning Well
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: All

Vocabulary Challenge offers four separate games that enhance or expand vocabulary through various means. In Matchword, you identify synonyms. Sticks and Stones, and To Be or Not To Be ask you to identify adjectives which are complimentary or non-complimentary character traits, and Oddball presents word associations.

Matchword uses a multiple-choice format showing a word in a box above four potential synonyms. You can choose from six difficulty levels and whether or not you want the game timed. Instead of the standard point scoring, you race the computer in trying to spell "Matchword." For each right answer, you get one letter, and for each wrong answer, the computer gets a letter—a refreshingly different way to score.

Sticks and Stones asks you if a character trait is a compliment or an insult. It has only three difficulty levels. To Be or Not To Be has almost the same format, and uses the same word lists. The only difference is that you can decide if the adjective describes something you want "to be" or not. Its too bad the choices are so limited, as I enjoyed these games the most.

Oddball presents four words and asks you which one cannot be logically associated with the others. This game is very familiar but should stimulate you since the types of associations are fairly novel, utilizing the functions as well as the categories of things. Getting the answer on your first guess gives you 100 points. If you are not correct, you get a clue and reduced points for your second try.

The utility section of *Vocabulary Challenge* is simply the best I have ever seen. For each of the four games you can establish your own lists of synonyms, compliments, and insults (with their respective definitions), and Oddball sets with the reasons for their associations. You can edit the list at any time or print it out. This versatility makes the program ideal for classroom use. Up to fifty records including players' names, games played, levels chosen, and scores can be saved to disk.

The documentation is excellent in every way. Essential information is given plus two pages of suggestions for supplementary activities. The manual also includes the complete word lists for the games.

Although there is not much call for graphics in a program of this sort, Learning Well did a nice job with the introductory screens. There is a thirty-day warranty for damaged-disk replacement, and a twenty-dollar fee to replace disks after thirty days to one year.

Vocabulary Challenge is powerful and flexible enough to be used by all ages. This is probably the easiest way to increase your vocabulary, either at home or in school.

GRAMMAR MASTERY Series A, B, & C

Regents/ALA Publishing Co.
$195.00
48K; II/II+/IIe/IIc/III

Overall Rating	A	B+	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	A	*Value for Money*
			Grades: Adult

Grammar Mastery is computer-assisted instruction designed for English as a Second Language (ESL) students at three levels: Beginning (Series A), Low Intermediate (Series B), and Intermediate (Series C). Priced separately, each series consists of six lesson disks and a General Start-up Disk. Lessons progress in the manner of most ESL texts. For example, Series A begins with the verb "be" in the simple present tense and ends with adverbs of frequency, manner, time, and place. Simple as the explanations are at this level, they are too sophisticated for first-time instruction in English. They better suit review and reinforcement. Series B begins with a lesson in yes/no questions and ends with a lesson on present perfect tense. Series C begins with the past perfect tense and ends with infinitives and gerunds. You can use the lessons either sequentially or independently of each other, in whatever order you prefer to correspond to the class text or to meet individual student needs. (See the review elsewhere of *Teachers' Management Program* from the same company, which permits teachers to keep individualized records of each student's performance in *Grammar Mastery* and *Vocabulary Mastery*.)

The typical lesson begins with an introduction reviewing the principle of grammar followed by a couple of sample questions. You get two chances to fill in the correct answer before the program gives you the correct answer and tallies the score. If your score falls below about 85%, the program asks the missed questions again. You can usually obtain additional help by pressing the Escape key. Although you might work faster if asked to type only the number of the correct choice, practice in typing the whole answer reinforces spelling. The graphics add visual appeal and contribute to instruction. For example, to illustrate the shift in position of the auxiliary word that changes a statement to a question, the program highlights the auxiliary word and then underlines it in a flashing, alternating statement and question. Alternatively, the auxiliary word "do" walks across the screen, accompanied by sound effects, to take its position at the beginning of a question. Then the display alternates the question and answer to emphasize the change in form. The sound effects, by the way, get your attention and provide useful instruction. They indicate better than words whether an answer is right or wrong, particularly for students who understand the language poorly. Students will love them, from "Tah-Rah-Rah-Boom-De-Ay" to "You Are My Sunshine" and teachers will tire of them (but can, if they choose, turn them off).

Grammar Mastery has a lot more variety than most computer-assisted instruction. Each lesson consists of four or five exercises of increasing difficulty. For example, Series B, Unit 1 presents five exercises in making and answering yes/no questions. The first exercise asks simply for the correct question auxiliary: do, does, did. The second exercise asks for both the auxiliary and a pronoun: do you, does she. The third exercise asks for the auxiliary, the pronoun, and the main verb: did you do, did you have. The fourth exercise permits you to pick from three topics—sports, music, or food—and asks simple questions answered by short answers: "Yes, I do," "No, I don't." (Contracted form required.) The fifth exercise also permits you to choose from three topics—this time marriage, politics, or travel—and asks for short answers that must include the correct subject pronoun: "Yes, it is," Yes, she is," "Yes, we are." Some units include pre-tests; others include exercises in drawing inferences. It's a sophisticated program that permits much variety. Every lesson defeats boredom by allowing you to make choices, or by clever use of graphics and sound effects.

I highly recommend this program, but with some minor warnings. First, ESL teachers or lab assistants must remain to "walk" students through the program at least once and possibly several times. Of course, they already know this from using language tapes and equipment with students working on simple grammar who can't follow complicated directions. Second, some of the messages can actually confuse students, such as "What an answer!" Intended as encouragement, it induces some students to interpret it negatively as a request for another answer. In general, though, I found such slips rare; the program usually anticipates and meets the needs of ESL students. I have seen eighteen year old ESL students use this program with delight and beg for longer sessions at the computer. I can't think of any better praise.

WORD MATCH

Ventura

This Concentration-style word game is part of Ventura's *Learning Potpourri*. See the General Education section for a review of the entire package.

Spelling

SPELLING LESSON DISK I

Behavioral Engineering
$24.95
48K; II/II+/IIe
Requires *Spelling Gallery*

Overall Rating	B	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	N/A	B+	*Value for Money*

Grades: K-3

Spelling Lesson Disk I is a module for *Spelling Gallery* (see that review). The module cannot be used without *Spelling Gallery* or its companion, *Spelling Strategy* (all are produced by Behavioral Engineering).

Spelling Lessons Disk I contains forty-one lessons each consisting of words beginning with the same letter. For example, lesson one contains all the "A" words, lesson two all the "B" words, and so forth. When used with *Spelling Gallery*, the lessons emulate an arcade game; the player shoots down misspellings with a "magic ray gun." Points are given for each correct answer while bonus points depend on the skill level and how soon the misspelling is recognized. The lessons can be run from a second disk drive, where they are automatically accessed by *Spelling Gallery*, or inserted in drive one or two when the master disk calls for them.

My comments about *Spelling Gallery* apply equally to *Spelling Lessons Disk I*. Lessons contained on this disk are intended for kindergartners through third graders. Some of the words seemed most appropriate for grades two and three. With the *Spelling Gallery* master disk and lesson disks one and two you can safely cover most words your child will encounter from elementary school to the beginning of high school. Again, the authorship feature and a little patience allow custom spelling lessons for any level.

FLASH SPELL HELICOPTER

Microcomputer Workshops
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: K-9

Flash Spell Helicopter provides practice in spelling of words entered in a management subprogram, with the reward of game time for correct responses. It supposedly suits kindergarteners through twelfth graders. When the program begins, it asks you for your name and then lets you choose the "dictionary" of practice spelling words. You also have the option of choosing how many words you want to spell during the session. For each word spelled correctly the first time, you log ten seconds of playing time with the helicopter game at the conclusion of your spelling practice session. You can have a list of the misspelled words displayed on the screen or printed out for further study. Onscreen directions and the documentation clearly explain how the program operates. It moves smoothly from spelling practice to the game, which you can play using the keyboard or a joystick (preferred).

The management system allows you to individualize the spelling practice to specific class groups. You can use a password to prevent students from disturbing the dictionaries. The management system's menu appears after you enter the password. You can list, edit, sort, add, and delete existing dictionaries and create new ones. Clear directions make management efficient and reliable.

Because of its straightforwardness, even a computer novice can successfully use *Flash Spell Helicopter* with students. I question the age span claimed, however. Kindergarten youngsters are not in a formal spelling program and need individual attention to work the program. It hardly seems necessary to formalize their instruction to this kind of drill and practice. High

school students on the other hand, would hardly find the helicopter game compellingly interesting. Nonetheless, the educational value of the format for spelling practice is sound. For remedial students in high school, teachers could formulate lists of the words that these students need to spell and offer some other reward system than the helicopter game. For primary and intermediate students, I can highly recommend this program.

MAGIC SPELLS

The Learning Company
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 1-5

With this program children aged six to ten unscramble and practice spelling words in a format that resembles an adventure game. When you boot up the disk, the screen shows a picture of a castle with the various choices available in a menu below it. Onscreen instructions mean that you don't have to read the documentation. You can easily make choices from the number menu. An option allows you to turn the sound on or off, as you wish.

The program disk offers two games, Scramble Spells and Flash Spells. The first shows a word from a chosen list, scrambled. You must type in the word correctly. Each correct choice opens one of the closed treasure chests across the top of the screen. An incorrect choice results in the gold being taken by the Spelling Demon. If you accept a hint, the chest will be empty when it opens and you don't get any points. If you get all the words right, you see a picture and hear a tune. The second game shows the word for a number of seconds (adjustable). You must then type the word correctly. Scoring works the same as in Scramble Spells.

The program provides a number of ready-made word lists, in addition to which you can write a custom list. This makes the program endlessly variable and greatly increases its educational value.

The package includes a clearly written, thirty-one-page manual. You cannot copy the disk, but if you damage it, the company will replace it for $10. The documentation doesn't give you a telephone number, but you probably won't need to call, either. The program works perfectly and I thought the instructions very clear. Too bad you can't back up the disk—I feel very strongly that programs intended for children should either be copyable or come with a backup copy.

Corinne Grimm, age ten, designed the graphics. Lo-Res and therefore a bit blocky looking, they will enchant some children because of the idea of a ten-year-old programmer. Others, like mine, will simply comment that it doesn't look like one of the better adventure games.

The games are very easy to use and the instructions clear. The Escape key returns you to the main menu at any time. I think the play action is interesting, and the variations in words and the time limits make the program challenging even for older children. It gives you good value for the money. The Learning Company has established a reputation for consistently excellent products, and *Magic Spells* is no exception.

SPELLICOPTER

DesignWare
$39.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A-	*Value for Money*

Grades: 1-5

Spellicopter puts pizzazz into an otherwise boring, but necessary, drill. You play the part of a helicopter pilot. At the landing area you receive a sentence with a word left out. Your mission: to fly through treacherous skies to the letter field, where you pick up scrambled letters in the right order to spell the missing word, then head back to the landing field to unload your cargo. This is simple only at the easiest skill levels with the fewest obstacles. The advanced levels are a different story. Try deciphering n-y-o-m-u-s-s-n-o-y as "synonymous," picking up each letter in the correct order, avoiding a continuous barrage of UFOs, and flying your cargo back through crowded skies to the landing field. Along the way you must avoid running out of fuel. The range of the game, as common in DesignWare's programs, is truly extensive. As far as construction goes, DesignWare seems to have thought of everything. The game doesn't crash, and things do what they are supposed to do. Onscreen instructions are in clear English, understandable even by less fluent readers. The excellent graphics even include a little man who waves to you as you unload. Other touches enhance the game, such as a fuel gauge, altimeter, and score keepers.

As an educational tool, *Spellicopter* equals many spelling texts but is much more fun. Context sentences

help a student learn to spell, while correctly unscrambling letters helps you measure progress. You are penalized for mistakes, but not harshly, and successful efforts yield rewards. Best of all is the game's versatility and range, capable of challenging many skill levels. In addition, you can individualize the game by adding your own list of words or constructing a fill-in-the-blank format. For example, the manual suggests a quote for the context sentence (To be or not to be? That is the question.) and the word, the author (Shakespeare). Creative teachers and parents have here an answer to teaching word skills without boring the student.

SCRAMBLE

Ahead Designs
$15.95
48K; II/II+/IIe; II w/Applesoft ROM

Overall Rating	B	B	*Reliability*
Ease of Use	C+	A	*Error Handling*
Documentation	B	B	*Value for Money*

Grades: 1-6

Scramble is a spelling program for children in grades one through six. It presents words with their letters "scrambled" or misspelled, projected on an attractive, Hi-Res screen layout. The letters are almost ¾ of an inch tall (on a 12 inch monitor), and the display shows a scoreboard with the points earned, number of words completed, and the descriptive name of the word list in use. The student is allowed two chances to spell the word correctly before the correct spelling is given. The words are in groups of 20, and up to 13 letters may be used for each word.

As the instructor, you have a number of options in setting up the program. You will decide which word list to use, whether or not to display the score, retain the sound effects, or allow the student to see the words before starting. You can also create and edit lists; the program comes with four, and the diskette will hold almost 200. *Scramble* keeps track of all your scores and is menu driven.

There are two areas that I think could be improved. First, the students' scores (for up to 30 students) are neither saved to disk nor can they be sent to a printer. You must enter the teacher utility to examine the "gradebook" and then make your own notes. The second problem is that the word list must be chosen by the teacher from the utility; the students cannot select the list they will work on without interrupting you.

On the bright side, the program is not protected, so you may get into it and make changes if you have the necessary skills. While you are poking around on the disk, take a look at ALPHASH; it is the subroutine that Ahead Designs wrote to create those ¾ inch letters and is free for you to use in your non-profit programs. In all, *Scramble* is a nice little program, and a good value for the money. Happy speling!

SPELLING WIZ

Development Learning Materials
$44.00
48K; II/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 1-6

Spelling Wiz is a missing letters game for children in grades one through six. The player must point the wand of a wizard at the right letter or letters of four choices and then fire before the bubbles from a pot neutralize the wand. The bubbles do their work in from five to thirty seconds, depending on which speed option is chosen. The wand can be neutralized three times before the game is over. You are not penalized for misses, although they are recorded. When you make a hit, the wizard's hat brim wiggles, there are sound effects, the letters fill out the word at the top of the screen, and a new word with blanks and letter options appears.

The game begins without instructions on-screen, but the instruction pamphlet with the disk is easy to learn. The player needs to use only three keys, or a joystick/paddle and fire button to play. Happily, keyboard players have three options of three keys: ADW for left-handers, JLI for right-handers, and left/right arrow & space bar for two-handed play. My keyboard played with more certainty and speed than the IIe joystick.

At the end of the game, the program displays hits, misses, and the high score in each category for the present session. At this point, the player or teacher can change the format of the game or continue the same game. The game can be changed in five ways: speed, grade level of word list (one through six), the specific word list (three lists of twenty words, one combination list), the degree of difficulty (from one letter to two or three missing letters), and maximum time per game (one through five minutes). You may also eliminate the sound.

As is typical of other games in the Arcademic series by DLM, *Spelling Wiz* comes with a fine teacher's manual and copy-ready worksheets, progress chart,

"Strategies for Improvement" form, and a student record sheet. The manual tells the teacher how to graph hits and misses, and then how to read the graph to determine the player's level. It also suggests appropriate extra-game work and kinds of reinforcement should the student become discouraged with his performance, or (worse) with microcomputer instruction. The worksheets partially make up for a deficiency in the disk: there is no "readout" of words missed at the end of each game. The worksheets set up every possible game in multiple choice format so the teacher or parent can determine, independently, areas of weakness at any given content and difficulty level.

JUNGLE RESCUE

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	C-	*Value for Money*

2 Levels
Level 1: Grades 1-4
Level 2: Grades 5-8

In *Jungle Rescue*, you play the role of a forest ranger stalking through the brush in search of monkeys endangered by a fire. Suddenly a monkey appears in your path. At the same time two words appear on the screen, one correctly spelled and the other (the same word) misspelled. You must type in the correct spelling. If you succeed, a brief melody plays and a helicopter hovers above the monkey. Pressing the space bar at just the right moment causes a rope to descend which lifts the monkey to safety. Color graphics nicely illustrate the entire episode. Actually, the program offers video game action as a way of maintaining your interest in spelling drills.

The game accommodates one to six players at a sitting. You enter each player's name into the computer, which then keeps track of everyone's score and whose turn comes next. After a prescribed number of rounds, the game ends with a display of individual scores and a list of missed words. This information is also automatically stored on disk for later recall by the teacher.

The impressive Teacher Utilities allow you to modify the program to accommodate various levels of ability. You can select a word list from among the twelve supplied on the disk. Each list contains twenty words chosen to test some particular spelling skill, such as making nouns by adding "ing" to verbs. When students have mastered all the supplied lists you can create new ones. You can also adjust the amount of coordination needed to accomplish a monkey rescue. Unfortunately, even at the more difficult settings the rescue quickly becomes too easy for all but the youngest children.

Jungle Rescue merely requires you to distinguish the correct spelling of a word from the incorrect spelling; it should require more. I am also troubled by the absence of any logical relationship between the spelling drill and the rescue game. The game is an entertaining—but irrelevant—reward for a good performance.

Learning Well supplies no backup disk with the package. Their replacement policy as stated in the documentation needs clarification. Apparently, a damaged disk is replaced free of charge during the first six months of ownership and for $20 thereafter.

SPELLAKAZAM

DesignWare
$39.95
48K; II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 2-8

Spellakazam is a spelling game for children seven through fourteen that places you and a magician in a simple maze full of letters in alphabetical order. Your task: to decide the missing word based on the context sentence clue, pick up each letter in that word from the board, and get to the top hat before the magician does. If you do, you get points and a turtle, duck, rabbit, or butterfly springs from the hat. You also get points even if the magician beats you, but not as many.

As with all their products, DesignWare has created a game of high technical quality. Play is straightforward, programs perform as expected, and many options for variation exist. DesignWare also based the program content on sound educational practices. Words cluster in rule families (like short a, vowel digraphs, c and ck, and so on), and you choose the rule you want to work on. You can also make your own rule and word clusters, adapting *Spellakazam* to your own needs or preferences.

Unfortunately, I had a few problems with the game and found it less appealing than other programs from the same company. The game and graphics seem oriented toward the younger side of the suggested seven to fourteen age range. A seven to eight year old

might find the animal graphics delightful and the maze interesting, but I doubt a twelve to fourteen year old would. Also, *Spellakazam* lacks onscreen directions, a feature needed by younger children. Finally, a view of the list option would help children working with more difficult words (such as "glorious" or "influence"). Currently, they are given only context clues and the first letter of the word. At the upper levels, children can often think of several words that would suffice.

With these reservations in mind, I still found *Spellakazam* an enjoyable, expandable game for younger children.

WIZARD OF WORDS

Advanced Ideas
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	A-	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: 2-8

With a shot of energy from his trusty wand, the Wizard transports you to the world of words. Spelling, color, sound effects, and graphics combine in five different games to provide an interesting educational experience. The program is recommended for children between seven and thirteen, but don't lock yourself into using it only for that group. Older folks can have fun with it and learn as well.

You can play three of the five games against another person, solo, or against the computer. All of the games have eight levels of play; some of them ask you what length of word you want to work with. The five games are:

1. Jester's Jumble—With a toss of the jester's balls, a group of letters appear at the top of the screen. You must figure out what the word should be. If you guess correctly, the jester juggles his balls and winks at you.

2. Castle Capers—A series of banners hang from the wall of a castle. You must guess the letters that make up a hidden word. If you guess correctly, a knight comes to your assistance to unfurl the correct banner. A wrong choice lowers the grate to the castle. Completing the word brings a troubadour to the entrance to play a tune.

3. Dragon's Spell—With a puff, the dragon displays a word that's long enough to spell other words. You earn points by using letters from the original word to make others, which the dragon compares with the Wizard's Word List.

4. Word Spinning—This crossword puzzle presents you with a group of empty blocks for which you provide the letters. You try to get more points than your opponent by placing words in the blocks. Beating the computer with its 38,000 plus words is quite an accomplishment. At the end of each game, the Frog Prince comes hopping across the screen and.... Really, now, you can't expect me to tell you everything, can you?

5. Herald's Hark—Here you can specify either a three, four, or five letter length for a word that you must then guess. The heralds tell you only how many of the letters are correct, not the word. Nope, you can't go through and say "bbb," and so on. I know, I tried. Each word you enter must be a standard word. As in all the games, a word that doesn't match any of the words on the Wizard's Word List makes you question whether you can find it in your dictionary—and look.

The Main Menu offers two other options. One lets you enter words of your own into the Wizard's Word List, giving you enough space to enter one hundred lists containing up to fifteen words each. These words then enter the Castle Capers and Jester's Jumble games. The editor, called King Author, lets you add, delete, change, and catalog your word lists. The other option proves useful for some school environments: turning off the sound. It takes some of the fun out of the program, but brings peace to a crowded area.

Wizard of Words has one great plus and a couple of drawbacks. First of all, the software is guaranteed to work as described in the manual for one year or will be replaced free of charge. Not only that, but when you send in the warranty card, you get a free backup. One problem, though, is that the information on the back side of the warranty sheet instructs you on using part of the program. You could copy the information, but why should you have to? The only other problem I saw was that you must remove the original disk whenever starting any of the games and either turn it over to use the Wizard's Word List or put in the recommended backup copy as advised. This means handling the disk more than you should. Younger users do have accidents, at times. An optional dual disk system would take care of this problem. Other than that, the program is great fun, quite educational, and well worth the cost.

SPELLAGRAPH

DesignWare
$39.95
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 2-9

This spelling game targets children seven to fourteen. Initially, squares cover a rebus, or word-picture puzzle. Uncovering the pictures and words square by square helps you guess the rebus. Like most programs from DesignWare, the game is well designed and easy to use. It boots from an easily escaped demo and offers simple onscreen directions.

After choosing the spelling rule you want to work with, you can elect to see the stimulus words based on that rule. The screen then clears and a context sentence missing one of the stimulus words appears below the rebus. Spell the missing word correctly and one square opens up to reveal part of the puzzle. When you think you know what the puzzle says, you type in your guess. You get points for spelling each word correctly and for each square left when you successfully solve the rebus. It takes some mental maneuvering to figure out the rebuses, but once uncovered they are quite straightforward. You eventually get the hang of the puzzle's idiosyncracies and need fewer squares uncovered to guess the answer. The game requires little manual dexterity, making it challenging, fun, and worthwhile for children who lack the motor coordination needed for mazes or shoot-'em-up games.

Spellagraph offers you many choices, adding variety with sound, background color, different skill levels (the harder levels have more squares covering the rebus), and the option of working with different spelling rules. For example, pick Short A and get words such as "ham," "man," and "at," or pick Vowel Digraphs and get such words as "influence," "glorious," and "premium." Quite a range. In addition, you can create your own word lists around a spelling rule—with great ease, believe it or not.

The only problem I saw was that you must spell the rebus perfectly. For example, a young child working on Short A words might find it difficult to spell h-o-l-e from a picture of a hoe and the letter L. He or she won't get credit until perfect, necessitating an adult or a dictionary nearby. That aside, I recommend *Spellagraph* for children at home or school who find puzzles intriguing. They'll have fun and might just improve their spelling in the process.

SPELLING LESSON DISK II

Behavioral Engineering
$24.95
48K; II/II+/IIe
Requires *Spelling Gallery*

Overall Rating	B	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	N/A	B+	*Value for Money*

Grades: 4-6

Spelling Lesson Disk II is a module for *Spelling Gallery* (see that review). It is useless without *Spelling Gallery* or its companion,*Spelling Strategy* (both produced by Behavioral Engineering).

Spelling Lessons Disk II contains forty-one lessons each consisting of words beginning with the same letter. For example, lesson one contains all the "A" words, lesson two all the "B" words, and so forth. When used with *Spelling Gallery*, the lessons emulate an arcade game; the player shoots down misspellings with a "magic ray gun." Points are given for each correct answer while bonus points depend on the skill level and how soon the misspelling is recognized. The lessons can be run from a second disk drive, where they are automatically accessed by *Spelling Gallery*, or inserted in drive one or two when the master disk calls for them.

My comments about *Spelling Gallery* apply equally to *Spelling Lessons Disk II*. Lessons contained on this disk are intended for fourth through sixth graders. Some of the words seem a little advanced to me, but I suppose it depends on how well your children spell. With the *Spelling Gallery* master disk and lesson disks one and two you can safely cover most words your child will encounter from elementary school to the beginning of high school. Again, the authorship feature and a little patience allow custom-spelling lessons for any level.

SPELL IT!

Davidson & Associates
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: 5 and up

Spell It! teaches you how to spell. It groups 1,000 words by level of difficulty and by spelling rules. Moreover, you can enter your own words. The pro-

gram comes on two disks, one of which includes data. To begin, you can either view a demonstration or go straight into the program. You enter your name and specify one or two disk drives, regular or bold printing. (Bold printing shows up better on a television screen.) You must configure the disk each time you boot it.

Before starting the lessons, you select a level of difficulty and choose which of the ten progressively harder word lists you want to tackle. Nothing tells you which list suits which grade level, but the vendor (according to the packaging) recommends the program for ages ten through adult. If you want to see the level of difficulty and the spelling rule for each list, look in the appendix.

Each level offers four activities. See It shows the word divided into syllables. Next, a sentence missing a word appears. You type in the word you saw displayed. You see your score after working through all the words on the list (or you can leave any of the exercises at any time by pressing the Escape key). Practice It follows the same format except that the word remains on the screen for a shorter time (adjustable from one-fourth of a second to five seconds). Unscramble It presents each word with the letters scrambled. One or two people can play, typing the unscrambled word in each of the nine boxes on the screen. If you play at a high enough level, this game can become quite challenging. The last activity, Spell It!, is a clever arcade game in which you feed a frog the correct word from the four choices offered. You can play this game with either the joystick or keyboard.

The program includes several nice touches: you can leave each exercise at any point and still receive a score; you can turn the sound on and off; you can use a joystick if you have one; you can review the words you missed; and you can change the options, such as sound or number of disk drives, at any point. Best of all, the Editor function lets you type in your own word lists and sentences. The manual clearly explains how to do this, but it takes a little practice to enter the sequences correctly. The error trapping and editing capabilities are quite good. The Editor function makes *Spell It!* very flexible at home or school.

A very good manual comes with the program. It takes you through each step of operation and provides a listing of all the words on the data disk. It even tells you how to initialize a data disk for your own information.

I thought the program well-designed and constructed, with great educational value and appeal. I also thought the price a bit high. Nonetheless, it offers good value and will give pleasure to the child using it, and satisfaction to the parent or teacher.

SPELLING STRATEGY

Behavioral Engineering
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Grades: 6-12

This rather sophisticated learning and testing program allows you to use its word lists or create new word lists on another disk. The latter feature allows you to adjust the program for younger children, which is important because the lists provided with the software best suit students in the sixth grade and up.

Spelling Strategy rests upon the assumption that eye movement (to the upper left or right) and visualization of words that eye movement permits are crucial to learning how to spell. In the learning phase of the program, *Spelling Strategy* prompts you to visualize the word by looking up and to the left (if you're right-handed), or up and to the right (if you're left-handed), then type in the word below the one you see on the screen. The authors' believe so strongly in their method that they then have you visualize the word and type it in backwards. After each step of visualization and copying, you take a test. Evidently, the theory is that you won't simply memorize the right order of letters temporarily, if you know that you'll have to type it in backwards. Maybe so, in the long run—if you're serious about learning. I found that I could speed through the program and defeat its best intentions by simply saying or thinking the letters in either order when I first typed in the word. You can easily remember such a code for the test that immediately follows. Correctly spelled words (normally or backwards) elicit sound, three flashes of the word, and an enthusiastic exclamation.

Apart from the questionability of the method in the learning phase, the only other problem concerns typing speed. The program cannot keep up with or correctly lag behind a moderately fast typist. After several tone warnings, you adjust your speed. Overall, I found the progression, onscreen prompts, visual and sound effects, and responses quite logical. Depending on the level you've chosen, you get second and third chances or immediate correction. The lessons include the following classes of words: 1) words commonly misspelled on college entrance exams; 2) words from the Gallagher-Colvin list; 3) special content words; 4) most difficult English words; 5) words used to check basic skills in grades six and twelve by the California Assessment Program.

Of course, the most versatile feature is the capability of authoring new lists on another disk. The program

asks you for (and gives you a chance to verify) the correct spelling of the new word and a short sentence featuring the word. You cannot edit the entry once it's made, but you can delete a whole lesson. You also enter several incorrect spellings of the word, avoiding an incorrect spelling that is itself a legitimate word because students who begin with the practice phase won't have seen the word list. In the practice phase, the program takes words from a given lesson chosen either from the master disk or the lesson file disk and displays them with incorrect spellings and a sentence containing either the correct or an incorrect spelling of the word. (You can go directly to the sentence phase if you wish.) You have a few seconds to choose the correctly spelled word (by its number) or decide whether the sentence contains the correctly spelled word (Y/N). Again, depending on the level of difficulty you have selected, you get up to three chances. A running score, short bursts of tunes, verbal strokes, and a wink of the eye provide positive reinforcement. My preschooler, who can't spell, made me put his name in the program and play much longer than I had planned because he liked this part so much.

The program comes with very clear instructions, both printed and on screen. It also offers some attractive displays for people with color monitors.

SPELLING GALLERY

Behavioral Engineering
$34.95
48K; II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 7 and up

Spelling Gallery by Behavioral Engineering is part of a series of educational programs based on a technology called Neuro-Linguistic Programming (NLP). The program helps you to learn and practice the strategy of expert spellers. Interviews have revealed that good spellers retain a mental image of words which causes misspellings to "jump right out at them." This program attempts to develop that mental image for you by reinforcing visual recognition, providing spelling practice, and developing copy-editing skills.

Basically, *Spelling Gallery* emulates an arcade game. The player shoots down misspellings with a "magic ray gun" as words pass by on the display. Then the correct spelling flashes onscreen and points and bonus points are awarded. The more points scored, the faster the gallery moves.

Each of the five lessons on *Spelling Gallery's* master disk can be played at three different skill levels. By means of an authoring system, you can edit existing lessons, delete lessons, or create your own lessons of up to ten words each. Editing a lesson requires that you go through the entire list of words to find the one to be corrected. When creating your own, the system asks for up to eight misspellings for each word and a sentence using the word. Be careful that your incorrect spellings aren't real words themselves. The sentence is for use with Behavioral Engineering's *Spelling Strategy*, purchased separately. (See separate review.)

Extra modules can also be purchased. These are designed for kindergartners through sixth graders. The words on the master disk are much more sophisticated. Additional modules can be run in either drive one or two.

Graphics used in the program are good except for excessive glare on my green screen, presumably from the arcade format. You have a choice of upper- or lowercase display. Uppercase is generally better because letters such as "w" and "m" look like solid blocks in lowercase.

Spelling Gallery is absorbing, and the philosophy behind the program seems sound. The program is well documented and easy to use. The simple authoring system allows for homework practice and promotes continued interest after the five canned lessons are finished.

THE BANK STREET SPELLER

Broderbund
$69.95
48K; II/II+/IIe/IIc

The Bank Street Speller is an elegantly simple spelling checker for *The Bank Street Writer*. See reviews for both in the Productivity section.

3 IN 1: WORD RESCUE/ MATH MANIA/ FOREIGN FRENZY

Stardust Software

An arcade-format comprehensive educational package that offers practice in spelling, math, and French/Spanish vocabulary. For a complete review, please see the Reading and Language Skills section.

Foreign Language

DIVIDE AND CONQUER

Davka Corporation
$34.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	N/A	A	*Value for Money*

Grades: 3 to adult

The time proven method for conquering the translation of a language into English, word dissection, involves dividing each word into its component parts (root, prefixes, and suffixes). *Divide and Conquer* applies this method to Hebrew. It primarily teaches beginning students the skills necessary to divide and translate even the most complex Hebrew words into English without knowing how to speak Hebrew. Such skills are essential to a thorough understanding of Hebrew writings, especially the holiest of them all, the Torah.

The program is completely menu-driven, obviating the need for documentation. At any given session, you select a study unit (such as noun prefixes) from the menu and proceed through a series of well thought out exercises and multiple choice or matching quizzes to develop that unit's particular translation skill. Each succeeding study unit builds upon the previously learned skills. Ultimately, you can translate a complete sentence unassisted. Along the way, you are continuously given opportunities to test yourself. The format is sufficiently varied so as to reinforce learning without boring you. A refreshing addition, a slight touch of animation, allows you to watch the appendage (prefix or suffix) move toward and attach itself to the word root. The ability to return to a previous "page" for review makes for easy use. Furthermore, the program's superior error handling manifests itself in the responses to wrong answers, which comprise part of the learning process.

All in all, *Divide and Conquer* is a valuable educational tool that no serious Hebrew student should be without.

DYNAMIC HEBREW DICTIONARY

Davka Corporation
$50.00
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	N/A	A	*Value for Money*

Grades: 3 and up

Dynamic Hebrew Dictionary consists of two double-sided disks containing a series of programs designed to help you master a large Hebrew vocabulary. The programs, which both teach and test, are geared for the beginning Hebrew student but also help those somewhat further along in their studies of the language. A total of several hundred Hebrew nouns divide into categories corresponding to objects and concepts in common use. Each word in the dictionary appears with a well drawn, colorful, high resolution graphic illustration plus its Hebrew and English equivalents.

Each side presents you with a list of the study units it holds. For example, Disk 1, Side 1 contains six units: fruits, vegetables, kitchen utensils, furniture, appliances, and various foods. After selecting a study unit, you can choose from three options: learn word meanings, be tested, or end the present session. If you decide to learn word meanings, you can either study the entire unit or a single word (listed on a submenu). When ready, you can take one or two tests: matching a word to the correct picture or matching a picture to the correct word. In each case you get two tries per question. You score two points for a correct answer the first time and one point for a correct answer the second time. In either method of testing, a correct answer results in the picture and the Hebrew word flashing to provide further reinforcement. Upon completing the session, you receive a cumulative score.

This easily used program moved more fluidly within and between study units than many of the other programs published by Davka. Also, the graphic formation of Hebrew characters looked considerably improved. The pictorial representations of the words have particular appeal for younger students. As for the documentation, the company supplies a short document describing the main features of the program and

provides a complete list of categories and words in the dictionary. However, you don't need documentation to run the program because it's completely menu-driven and requires no written explanation.

All in all, I highly recommend the program. I think it well worth the expense because of its uniqueness and superior educational value.

CHUMASH COMPU-FLASH CARDS

Davka Corporation
$20.00 each
48K; II+/IIe/IIc

Overall Rating	B	B-	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	N/A	B	*Value for Money*

Grades: 4 and up

Chumash Compu-Flash Card teaches and tests the translation of words taken from the bibilical book of Genesis. The program "flashes" a word in Hebrew and you respond by giving its English translation. The words are grouped into six sets, with sets from later portions containing words from earlier portions. Upon selecting one of the six sets, you have the option of seeing the words in English and Hebrew before being tested. Once you have selected this option, you must view all the words in the set. In the test mode, you get only one chance to guess the English translation of the Hebrew word; otherwise, the computer provides the correct answer. The program keeps your score in terms of the number of correct answers out of the number of tries. You can quit at any time during the test, obtain your final score, and exit the program. Unfortunately, the only exit provided reboots the disk rather than returning you to the Main Menu. This minor inconvenience is typical of other programs in this Hebrew educational series, as well.

I found one disconcerting bug in the program which, although not affecting its use, bothered me when it first occurred. When loading word list #5 from the disk, the screen flashed the message "One moment please" after which the word "reenter" appeared eight times in succession before the list was finally loaded.

All in all, the disk has good educational value for the student who has already learned to read Hebrew and wants to build his vocabulary. The flash card approach used in this program is a tested and proven educational method for accomplishing this goal.

COMPU-DIKDUK

Davka Corporation
$25.00
48K; II+/IIe/IIc

Overall Rating	C+	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	N/A	C+	*Value for Money*

Grades: 4 and up

Compu-Dikduk consists of a single-sided disk containing three programs designed to reinforce understanding of basic aspects of Hebrew grammar. Let me emphasize "reinforce understanding" as opposed to "teach" because the first two programs assume prior knowledge of the subject and consist merely of a series of multiple choice questions followed by the score at the end of the unit. The first two programs deal with (1) prefixes and suffixes and (2) present and future tenses. As such, they have limited educational value for the novice. The third program, which deals with declension of nouns, is much better done and appeals even to people with little or no prior knowledge of Hebrew.

You boot up the disk like any DOS 3.3 disk, thereby displaying a menu of the three basic lessons. The first program asks twenty-six questions and the second, eleven. You can quit a unit at any point and obtain your score in terms of the number of responses required to answer each question correctly. As in many of the other disks in this series, if you decide to continue using the program after receiving your score, the disk automatically reboots rather than returning you to the Main Menu. I thought this only a minor inconvenience because it happens so quickly. A positive feature I should mention concerns the dynamic graphics. They spice up what might otherwise be a dull, all-text exercise. In particular, the second program rewards a correct answer by drawing a box around the prefix and/or suffix of the root word that defines the tense, gender, and number (singular or plural) of the phrase.

In summary, you should purchase this disk only after learning something about reading and translating Hebrew.

LEARNING TO READ HEBREW

Davka Corporation
$50.00
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	C-	B+	*Error Handling*
Documentation	C-	B+	*Value for Money*

Grades: 4 and up

To successfully learn any foreign language whose phonetic alphabet differs from ours demands an educational tool that teaches, in a simple manner, both pronunciation of individual consonant and vowel phonemes, and words and phrases. This two-sided disk skillfully accomplishes these goals in a self-paced course on Hebrew. *Learning to Read Hebrew* contains fourteen units of instruction, each with quizzes and review material. You need no prior knowledge of Hebrew, or for that matter, computers, to use this software effectively. The program targets the neophyte (it suggest an age of ten or older), or someone already familiar with the language who wants to brush up on pronunciation.

The authors wrote this program as a machine equivalent of the most patient and sensitive human tutor. You progress at your own pace, guided carefully through the material. You select one of the learning units (the first of which explains the rules) to begin. The program presents each Hebrew letter in that unit and spells it phonetically in English, thus assuring correct pronunciation. The Hebrew letters appear graphically on the high-resolution screen; they are very well done when compared to printed text in this language. Practice reading and challenging quizzes combine the letters for a particular learning unit into words.

Forgetting for the moment its educational value, the disk suffers in terms of ease of use. Unfortunately, when you enter a learning unit, you must complete it in its entirety before you can go on to another unit. This inability to escape to the Main Menu can become more than a mere inconvenience because of the length of many of the units. The more advanced student might well want the option of skipping over the reinforcement. On the other hand, I thought the error handling reasonable. If you return an incorrect or inappropriate answer to a question, the program gives you repeated opportunities to answer correctly.

In summary, *Learning to Read Hebrew* can competently help you master Hebrew. Provided you have the patience to complete all of the units, you will feel that you spent your money wisely.

WRITE HEBREW (Children's Version)

Davka Corporation
$25.00
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	N/A	A	*Value for Money*

Grades: 4-8

Write Hebrew (Children's Version) teaches cursive Hebrew writing to young students. The material is nicely organized into seven study units, each of which begins with the lesson and ends with a review. An eighth unit, a cute "shoot the Hebrew letter" game, tests all that you have learned previously. The lessons are written in a clear, humorous fashion that should appeal to children. It contains much reinforcement, essential to learning. The review exercises test not only the cursive script learned in that particular lesson, but also the material covered in previous lessons. You benefit most if you proceed sequentially through the seven study units and then play the game.

The graphic formation of the block Hebrew letters and their cursive equivalents is very well done. Unlike many of Davka's other programs, this one allows you to quit in the middle of any of the lessons and return to the Main Menu without rebooting the disk. Although the program has no documentation, it is completely menu-driven and self-explanatory.

Clearly, a lot of thought went into the development of this appealing program, making it both educational and enjoyable. I highly recommend it to young students of Hebrew.

READING RASHI

Davka Corporation
$25.00
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	C+	A	*Error Handling*
Documentation	N/A	B+	*Value for Money*

Grades: 5 and up

Rashi (abbreviation for Rabbi Shelomoh) was a famed interpreter of the Bible and Talmud and a noted authority on Jewish law. His cursive script (used by Spanish Jews and frequently used in printing rabbinical works) represents a modification of the usual square Assyrian script, designed to expedite writing.

For example, the *het, gimmel,* and *shin* in this script take one stroke each instead of two to three.

Reading Rashi familiarizes you with the Rashi script letters. The single menu offers two lessons in Rashi and two corresponding reviews. You must complete each fairly lengthy lesson in its entirety before going on to the next. You cannot exit the program from within a lesson, nor can you enter a lesson in the middle. Thus, you cannot go to the review material from within a lesson without rebooting the disk. Such inflexibility is typical of Davka's software. It inflicts an unnecessary inconvenience to otherwise excellent educational ethnic software.

The graphics used to form the Rashi script are quite good, with the added touch of occasional animation to emphasize certain points. The package includes no documentation, but the program really doesn't need it—it's self-explanatory. *Reading Rashi* moves a bit slowly; I think the delay between the posing of the question and the prompt for an answer is unnecessarily long.

Except for the technical objections mentioned above, the program accomplishes its goals well. Clearly, it has no competition. I recommend it to students who want to learn to read Rashi script.

DEUTSCHE GRAMMATIK "DER-DIE-DAS"

Gessler Educational Software
$31.95
48K; II/II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B-	*Value for Money*

Grades: 7 and up

This program helps you review German definite articles (der, die, das), which change form according to their function in the sentence or following certain prepositions. Remembering which form to use bedevils many a language student, but *Deutsche Grammatik* offers a valuable tool to anyone studying German. Four sections make up the quizzes: the nominative, accusative, and dative cases; the accusative and dative prepositions; the either/or prepositions; and a thirty-question final examination. The quizzes take the form of fill-in-the-blank questions. Before each quiz you can review the grammar covered in that section and can call up the Help mode at any time, except during the final examination. You get three incorrect guesses before the program gives you the correct answer during quizzes, but the final examination allows only one guess per question.

While the program is loading, the screen message says, "Please Wait I'm Getting Loaded," a touch of humor that anyone can appreciate. Some interesting graphics appear in the title portion and at any point in which you stop the program. I would like to see more throughout the rest of the program. Instructions, such as when to press the space bar, appear twice in both English and German and thereafter in German only. Congratulations and encouragement for correct responses appear in German, which provides valuable additional exposure to the language. Each section contains about forty-five questions which also appear in the documentation. Often, the questions seem to repeat every time you run the program. The final examination randomly selects thirty questions, drawing from all three sections. Scores appear as percentages and the number right. My score *did* improve as I used the program, by the way.

The program's educational value increases because of the immediate reinforcement it provides and the clues you get after each incorrect response. An option to add your own practice questions would further enhance *Deutsche Grammatik*, particularly since the 140 practice questions soon become much too familiar. Nonetheless, the program offers a good review for German students.

LA CORRIDA DE TOROS

Gessler Educational Software
$29.95
48K; II+/IIe/IIc

Overall Rating	C-	B+	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B	D	*Value for Money*

Grades: 7 and up

La Corrida de Toros belongs to Gessler Educational Software's series of programs for classroom use. Based on a list of 200 words in five categories, the program includes three sections: the review, a matching game, and the "Corrida." The lists of words include vocabulary (nouns) for the topics "en la escuela," "dias, meses y tiempo," "en casa," "poner la mesa," and "profesiones y oficios." Each list can be divided up into a group of ten easy words and a hard group. No provision exists for you to add your own vocabulary list—which severely limits the usefulness of the program. The words are correct standard Spanish with accents and tildes. The student controls the pace of the games on the menu-driven disk; he can reboot at any point using Control-Reset.

If you elect to review words after choosing a topic and level of difficulty, the ten words of that list appear on the screen. Choosing the matching game prompts a similar list, although this time numbers precede the Spanish words and letters precede the English words. You must match the letter to the number of the word with the correct meaning. When you have matched all ten pairs, you see your score and a list of the words you missed. The same words appear (in the same order) in "Corrida," a picture of a bullring supporting the Hangman game. The toreador appears at the left edge of the screen, the bull on the right edge. Each noun appears with the appropriate article, always in the same order. If you guess the word correctly, the bull moves across the screen, only to be stabbed by the toreador and collapse. If you do not get the right answer, the figure of the bull moves across the screen and disappears, supposedly flying into the crowd. I question the use of these images from both a programming and an educational standpoint. Spaniards consider the Corrida an art. This program's presentation clearly does not teach their culture or philosophy, nor does it appropriately reward you for a correct answer. I hardly consider watching a tiny bull move across the screen to be killed (after a slightly off-key rendition of a bullfighting theme) a reward.

You get one disk with Gessler's usual warning against making backup copies, a process that destroys the disk and voids the sixty-day warranty. You cannot network the disk, but you can purchase backup disks for $9.95 plus shipping charges (within six months of the original purchase).

Although the jacket boasts "Hundreds of vocabulary words! Excellent high resolution graphics and sound. A stimulating way to learn new words and reinforce knowledge of spelling and meanings," the limitations of this program far outweigh its possible advantages.

LA GUILLOTINE

Gessler Educational Software
$29.95
48K; II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	C	B	*Value for Money*

Grades: 7 and up

La Guillotine is the French version of the Hangman game. The cute graphics (when you find the correct word in time to spare the victim's life) form the program's main attraction. The rescued victim turns and smiles while *La Marseillaise* plays. The program builds vocabulary among beginning and intermediate French students, with words from five areas: class; days, months, seasons, and times; home; restaurants; and professions. Each category has twenty easy (common) words and twenty more difficult (less common) words. You can choose easy or hard.

The program works well and may motivate students who like to play games to learn some useful French vocabulary. I doubt, however, that the method uses your time efficiently. Also, you should get a chance to see the list of words before playing the game to have a reasonable chance of guessing the word before the blade falls. The instructions make no mention of the most effective teaching method for this program, nor does the program allow you to change the words. If you could enter your own lists of vocabulary words, the program would be more valuable. Finally, you cannot copy the program nor network it, so schools with multiple computers will have to purchase multiple copies of this program for parallel use.

PRACTICANDO ESPANOL CON LA MANZANA II

Conduit
$110.00
48K; II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 7 and up

This program helps you master Spanish with three extensive verb practice drills (Easy, Hard, and Command) and one extensive vocabulary drill. All drill items appear in random order. If you answer correctly the first time, this eliminates the item from the practice list. The drills, which allow you to control the pace of review, best serve as extensions of classroom instruction. Enjoyable and challenging, they help motivate your interest in the language as well as involve you in the learning process. They also provide quick and meaningful results. The practice drills help you recognize your own problem areas and develop the critical attitude necessary to improve your linguistic ability yourself.

Easy Drill includes nineteen drills of twenty items each. Each drill covers a specific verb form. As soon as you have become familiar with all three types of regular verbs in the present indicative tense, you should benefit from the quick-change practice of this drill. The program provides good hints when requested and

the quick review is excellent. You can change the drill to include items of current interest.

Hard Drill offers options for practice with fifty-four verbs, nine verb tenses, and four difficulty levels. The lower level drills take you through simple reviews to build your competence—and confidence. The upper level drills provide new information or serve as a review of difficult and irregular verbs.

Command Drill includes fifty negative and affirmative familiar, formal, and plural commands with an optional object pronoun component. This drill stimulates the respond/check process that precedes oral commands. You can easily correct mistakes. Positive reinforcement follows, but the hints offer little help for anyone having a great deal of difficulty.

Vocabulary Drills are designed to accompany the following textbooks: Turk, *Foundation Course in Spanish*, 4th ed.; Leslie, *Spanish for Conversation*; La Madrid, *Communicating in Spanish*; Settgast, *Basic Spanish*, 2nd ed.; and Turk, *Mastering Spanish*. The class instructor can enter, correct, change, and delete items from these drills in order to suit the material to other texts. In these drills, you respond to English words with the Spanish equivalent. The program has provisions for accepting alternate correct responses. This section requires more effort from the instructor, because he must define the overall objectives, determine the scope of the drills, and decide upon acceptable alternatives.

If you want a flexible program that motivates students to study Spanish on their own, *Practicando Espanol con la Manzana II* gets them involved.

PRESENT & PASSE COMPOSE—FRENCH VERBS

Gessler Educational Software
$35.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: 7 and up

This program teaches and reviews the formation of present and passe compose tenses of regular and irregular French verbs. The available list of approximately eighty words suit first-year French students, or serve as a review for all levels. The program consists of six parts: 1) present regular verbs ending in "er"; 2) present regular verbs ending in "ir"; 3) present regular verbs ending in "re"; 4) present irregular verbs; 5) passe compose with avoir; and 6) passe compose with etre. Each section reviews the conjugation of ten or more verbs and quizzes the user with using a form of the verb in a sentence. The program checks both spelling and accent marks for accuracy.

Present & Passe Compose—French Verbs is a good tool for learning or reviewing the most useful French verbs. User-friendly, it gives you a second chance during the review and keeps track of correct and incorrect answers during the quiz. One feature would add immensely to its value: the ability to add your own lists of verbs.

The program has some important drawbacks: you cannot copy it for backup purposes, you cannot network it, and you cannot use it on a hard disk. Any attempt to copy destroys the program. Even an innocent attempt to back up the disk (before reading to the end of the documentation) could ruin the disk and definitely voids the replacement warranty.

SPANISH VOCABULARY GAMES

Queue Intellectual Software
$34.95
48K; II/IIe

Overall Rating	B+	B-	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B	B+	*Value for Money*

Grades: 7-12

Spanish Vocabulary Games is a fun way to strengthen your Spanish vocabulary with game-oriented exercises. The basic package contains two disks and a teacher's manual.

The Vocabulary Games disk groups vocabulary words and their translations into twenty files such as Activities/Recreation, Animals, Clothing, House/Furniture, and so on. These are used by the seven vocabulary games on this disk, which include such favorites as Hangman, Tic-Tac-Toe, Scrambled Eggs, and a Word-Search puzzle.

With the Vocabulary Games Utility disk, you can create, edit, view, and store other vocabulary files. For added reinforcement, these files can be keyed to the chapters of any text being used for classroom instruction. You can also add to the canned vocabulary files on the game disk.

For the most part, the software is simple to use with easy-to-follow, menu-driven commands. The teacher's manual offers little as an educational guide but adequately explains how to use the software.

On the negative side, the program suffers from a potential bug in the software and a few inconsistencies. For example, be careful when typing in the password (access code) to gain access to the utility disk. This password consists of a string of three letters followed by three numbers and is found on the last page of the teacher's manual. Since the program tests the password as a character string, any blanks (spaces)—between the letters and the numbers, for instance—are crucial. One disk I tested included a space, but another one didn't.

When you are selecting the Edit Vocabulary Files option on the utility disk, the program should prompt you to insert the games disk, since that's where these files are stored. Instead, the utility disk spins as if loading a file and then comes up with the statement, "The vocabulary files are not on this disk". Well, that's obvious! This mildly annoying response could easily be fixed by the authors.

Worst of all, the original review copy that I received had a bug in it that was related to the Edit Vocabulary Files option. The program did not recognize an accented vowel in a Spanish word! It printed out the part of the word prior to the accent and then defaulted with a syntax error. After I informed Queue of this problem, they assured me that future copies of the program would be bug-free and that anyone who had previously purchased the package would be entitled to a free replacement.

Despite these problems, *Spanish Vocabulary Games* should be seriously considered by the student looking for a pleasant way of expanding his Spanish vocabulary skills. The program is both entertaining and educational, and a very good buy for the money.

WRITE HEBREW (Adult Version)

Davka Corporation
$25.00
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	N/A	A	*Value for Money*

Grades: 8 and up

Write Hebrew (Adult Version) teaches cursive Hebrew writing to adults. It is virtually identical to its counterpart, *Write Hebrew (Children's Version)* with the primary difference being the complete absence of childlike humor. In fact, I found so little difference between the two programs that I don't know why two versions exist (I wouldn't purchase more than one of them). Clearly, a child would benefit from the adult version and an adult could enjoy the small bits of humor found in the children's version. The lessons, reinforcement, and game at the end are identical. Any adult with half a sense of humor would, like me, slightly favor the children's version.

GERMAN VOCABULARY FOR SHOPPING USE

Control Data Corporation
$39.95
48K; II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A	*Value for Money*

Grades: 9 and up

German Vocabulary for Shopping Use belongs to the Plato System. It provides drill and practice in recognizing and understanding words in the categories Clothing, Personal Items, Toys/Games, Tools, Furniture, Household Items, Outdoor Equipment, and General. You can practice English to German, German to English, or a combination of the two. Before or after practicing, you can review vocabulary lists on the computer or in the documentation.

Practice consists of two drills in the form of games: Hangperson and Pyramid. Hangperson (the old game Hangman with a new name) involves guessing the correct letters of an unknown word using all the letters of the alphabet plus German umlauts. The letters disappear as you guess them. The program rejects duplicate answers. The article (Der, Die, Das) counts as part of the word and it helps to guess it first. You get five wrong guesses before the stick person is completed and hung. Pyramid asks you to choose the correct translation of a German or English word from answers in a multiple choice format. Each correct answer builds a block of the pyramid and wins money for you. Each question doubles the amount of possible winnings, but wrong answers erase all blocks and the value of the question drops to $2.00 (the beginning value).

You can toggle sound effects on or off. The graphics are good, although you may have trouble reading capital letters occasionally because of the shape or umlaut. You need a basic knowledge of German for this program, which stresses sight recognition of words to build translation skills. You get plenty of reinforcement in reading German, but don't expect to be able to hold a conversation in German at the end of the drills. Actually, the program is best used as part of a more comprehensive language course or as a review. Studying alone gets the maximum benefit, but the program also suggests group and teaching activities.

GERMAN VOCABULARY DRILL

Compu-tations
$29.95
48K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	A	C-	*Error Handling*
Documentation	A-	B+	*Value for Money*

Grades: 11 and up

German Vocabulary Drill helps make learning German fun and eases this through the use of computers. The program consists of two basic sections: the self-test, which offers practice in the meanings of German or English words; and the index, entered by a password, which lets you develop custom word lists or revise existing lists. The self-test contains eleven word lists including common household terms, colors, numbers, animals, and so forth. You can create new vocabulary lists of up to twenty-five words. The program keeps score of total correct and incorrect answers and the percentage of correct answers. The program offers immediate reinforcement of answers and incorrect answers repeat randomly until you correct them. Monitor messages usually are in German. You must respond precisely to each question, including capitalization of nouns and the correct gender, indicated by the article, plus umlauts where appropriate. Simple control commands allow you to capitalize and include umlauts in the upper- and lowercase display.

The program does contain errors. For example, one word list has the English word "knive" as the equivalent of the German "Messer" (knife). You should correct these errors when you find them. You need not include the article in lists that you enter yourself, but you probably should. Another problem arises when you try to backspace to correct the first letter of your answer: you can't. However, you can correct the other letters.

In addition to the program manual, Compu-tations provides a supplementary booklet containing explanations of basic grammar, pronunciation, common phrases, and a few quizzes on the booklet's contents. You can get hard copy of your word lists if you wish. The program is designed for the Epson MX80. I have that printer, but the first time I tried to make a copy, the program did not send line feeds to the printer, causing it to overprint. A replacement disk sent by Computations corrected that problem.

Although I generally oppose computer-assisted instructional programs that merely look like tests on a computer rather than paper, this program impressed me (though it could definitely use some imaginative graphics.) Best of all, it allows you to revise, delete, and create new vocabulary lists which is preferable to getting stuck repeating the same vocabulary, something that gets tiresome. Many English-speaking people have trouble mastering the concept of the noun in German because the gender changes in the article must be memorized. *German Vocabulary Drill* makes this task a little easier.

SPANISH FOR THE TRAVELER

Roger Wagner Publishing
$59.95
48K; II/II+/IIe

Overall Rating	A	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: Adult

Spanish for the Traveler is a well-programmed, value-packed program useful for people planning to travel in Spain or South America. The program comes with a seventy-page booklet containing a setup and operating instructions, a list of the words and phrases used, plus the master disk and four double-sided audio cassettes. Quite a lot of material for $59.95.

Seven lessons (six covering basic traveling needs and the last one devoted to teaching numbers) are supplied. Each lesson has forty words, fifteen sentences, and 120 expressions. After each lesson, you can take a vocabulary quiz. The audio tapes, which you play while you watch the screen, provide the correct pronunciations.

The combination of listening to the words, seeing them displayed on the screen, studying the definitions, and then repeating them in the quizzes is a time-tested method of instruction at which the computer and the tape recorder excel. This is indeed a painless and relatively inexpensive way to acquire a little useful vocabulary for your upcoming vacation or business trip.

The master disk must be copied before use. You can make up to three copies from the master disk, which is extremely generous. I did run into problems here, though. The master disk did not have the required "write-enable" notch cut into it, and I wasted a frustrating half-hour before figuring out the problem. After cutting the notch I made my backup copy without a hassle. This certainly reflects a bit of carelessness on the part of the vendor.

Aside from the initial copying difficulties, I only noticed one other small error, this one grammatical. Otherwise, the pronunciation is excellent and the vocabulary well chosen and up-to-date.

Geography

AMERICA COAST TO COAST

CBS Software
$49.95
48K; II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	B-	*Value for Money*

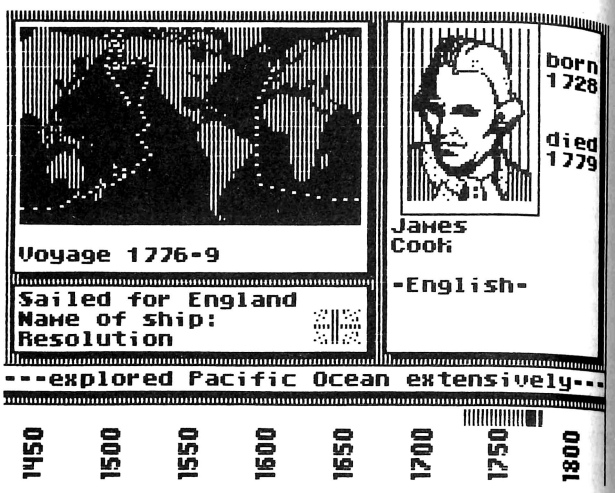
Grades: 3 and up

America Coast to Coast features five geography programs for students aged eight to adult. The first module, State Facts, presents information about each state, along with a colorful map showing their locations and shapes. In addition, each state's capital, nickname, year of statehood, and one of its major industries appears with a press of the space bar. This information is then used to play four separate games. To make the program interesting as well as easy to use, CBS provides a soft plastic keyboard overlay that puts each state's postal abbreviation on one of the keys.

State Quiz is a computer-generated question and answer game. A state is highlighted on the map and the student must press the appropriate key. If he is correct, the computer displays several multiple-choice questions about that state. If the student gives an incorrect answer to any of these questions, he is told not only that he is wrong, but also which state the fact relates to, so he is always learning.

The object in Mystery State is to correctly identify the computer's chosen state through direction clues. The student guesses a state, then the computer tells him what direction the target state is in with respect to that guess, for example, "The mystery state is south of Kansas."

Across the U.S.A. tests your knowledge of state locations. The goal is to move from your starting state through intervening states until you arrive at your goal state. Each state you choose must border on the one you are presently in, if not, the computer asks for another choice. The object is to make the journey in the fewest moves. On the easiest levels, a map is always displayed. On the medium level, states are displayed



only after you press a state key. On the hard level, states are not displayed at all; you must visualize your route mentally. Just for fun, try connecting Maine to Florida.

The final game, State Shoot, is terrible. The object is to shoot a state with an arrow that moves up and down along the left side of the screen. You hit the space bar when the arrow is vertically aligned with the state, then listen to a ticking sound to time the distance the arrow must travel before releasing it. If you manage to make a hit, you then name the state. A wrong guess costs five shots. Naturally, big states are easier to hit than small ones. Unfortunately, they are in the west, closest to the left side of the screen, and timing the arrow is not too difficult. However, with the small states in the east, timing becomes a major problem. Imagine trying to figure out how long to wait to hit a small, narrow state like New Jersey, and you'll understand how frustrating this game can become.

America Coast to Coast is basically a geography textbook that presents facts visually. The technique of highlighting states on a map and asking questions about these states provides good reinforcement, and the program does help students learn more about our country.

SEA VOYAGERS

CBS Software
$39.95
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	B	*Value for Money*

Grades: 5-11

This educational program traces the lives and adventures of the most famous explorers of the fifteenth to eighteenth centuries who discovered the world by sea. It charts their courses from the earliest like Columbus, Diaz, Cabot, and De Gama (who mapped the coastline of Africa), to the last of the great explorers, Cook, Bering, and Wallis, who explored the Arctic and Pacific Oceans nearly three centuries later.

Background information for each explorer can be found in Explorer Profile. Here, the student learns the important details of each explorer's life, including nationality, life span, the countries he sailed for, ships' names, voyage dates, and noteworthy achievements. Some very good graphics are used to provide a portrait of each person plus a map showing the route he sailed. These facts must be learned first in order to play the games included in the package.

The object of Who Goes There? is to correctly identify a randomly selected explorer by the facts given, in the fewest possible guesses. Some of the clues are relatively obscure, such as "He sailed for Spain," while others nearly pinpoint the man. You have five guesses to get the answer and you receive more points if you need fewer clues.

One of the nice features of *The Sea Voyagers* is that it comes with a plastic overlay for your keyboard that simplifies keyboard entry. The name of each explorer listed separately on a key, so the student doesn't have to type in their full names every time he makes a response.

In Explorer Mix, the object is to match three facts with three portraits by rearranging the facts using the "A," "B," and "C" keys on the overlay. If correct, the student sees a new set, otherwise he gets a second chance.

In Explorer Match, there are two levels and you can either play against the computer or another player. You see five randomly selected portraits. You may discard some or all for replacement. Like in Poker, you try to group them by a certain trait (five of a kind, or a pair, etc.) In the hard version, you can group them by the centuries in which their voyages took place, regions of the world explored, or countries sailed for. In the easy version, you group them only by countries sailed for. There are five rounds.

The Sea Voyagers is well suited for classes in World History at the fifth through eleventh grade levels. Once the facts are mastered, however, the games have little repeat value, so it would not be a good buy for home use.

ISRAEL GEOGRAPHY GAME

Davka Corporation
$24.95
48K; II+/IIe/IIc/III in emulation mode

Overall Rating	B-	C	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: 5-9

Israel Geography Game uses the high-resolution screen to draw a map outline of the four main regions of Israel. The map, with blowups of the regions, also serves as a quiz. You try to guess the locations displayed on the screen map. First you see an enlarged section of the area, then hints on what happened there historically. The program gives you three clues and you win points according to how many clues you needed to name the location correctly. A correct answer after the first clues garners fifteen points; after the second clue, ten points; and after the third clue, only five points. If you still haven't figured it out, you see the location but don't get any points.

Each of the four regions—Galilee, Central, Negev, and Sinai—has a different number of locations (six, eleven, five, and two, respectively). With only eleven locations to guess at most, it shouldn't take long before you have memorized them all. One good point: You must type in the answer to each question, not just pick your choice. Another good point: Once the program has given you a location, it will not allow you to return to that location to earn extra points.

A couple of problems with the program disappointed me greatly. With the quality of the instructions and the well thought out idea behind the program, I found it aggravating to see some of the clue words split in the middle and carried over to the next line.

Everything else works as it's supposed to. The material has educational benefit and is worth the money—as long as it's used for classroom study. To purchase the program merely for one student lessens its value because you'd soon memorize the information and relegate the program to the shelf.

AUSTRALIA TOURS

Sterling Swift Publishing Company
$39.95
64K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B-	B	*Value for Money*

Grades: 6-9

Australia Tours makes the student an Australian tour guide to teach him about that country's geography. While working for Australia's largest tour agency, the student is sure to learn some valuable lessons about money management as well as geography.

The student's job is to answer the customer's questions and take him by helicopter to the destination of his choice. Travel distance to each destination determines the tour guide's earnings. In order to take customers to a location, the student must answer questions about it. When he answers correctly he gets to lead the tour and earn $.75 per kilometer. When two customers want service at the same time the student must determine which destination is worth the most money.

Trips to the wrong place cost not only a day of travel time but also ten percent of his current earnings as a penalty. Explanations are given after wrong answers.

To obtain help in answering a question or a location on the map, the student types the word "Guide" or the letter "G" when moving the sensor. In response, the senior guide will take the student to the right place. When the senior helps, the student must split the money earned for the trip with him. On the Apple II and II+ the sensor is moved with the I, J, K, and M keys. On the IIe the arrow keys move the sensor.

The program keeps track of the amount of money earned, number of wrong answers given, and the number of guides used. The teacher's manual provides a complete listing of provinces, cities, and other areas used in the program.

Australia Tours provides the student with an excellent opportunity to learn about the land "down under."

Sterling Swift's catalog provides a ninety day unconditional guarantee against defects in workmanship or disk malfunction. After ninety days from date of purchase, any damaged disk will be replaced by the publisher for $9.95 and proof of purchase.

NEW ZEALAND TOURS

Sterling Swift Publishing Company
$39.95
64K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B-	B	*Value for Money*

Grades: 6-9

In this clever geography game, the middle school student assumes the position of temporary guide for New Zealand Tours, the country's largest tour agency. The student answers customer questions and takes them to the destinations of their choice. Tour guides earn $2.50 per kilometer for trips out of town and a flat rate of $25.00 for each in-town tour. Each student's success is determined by the amount of money he earns.

When two customers need help at the same time, the student must choose the one whose destination will earn the most money for the agency.

When customers ask to be taken to a specific destination, the guide must move an onscreen sensor to the proper place on the map. Apple II and Apple II+ users use letters I, J, K, and M while Apple IIe users use the arrow keys. Students can obtain assistance reaching destinations by typing the word "Guide" or using the letter "G" when moving the sensor. Using guide assistance costs fifty percent of the fee. Traveling to the wrong place not only wastes a day of travel time, but also costs the guide ten percent of his current earnings as a penalty.

Each time the students use *New Zealand Tours* their knowledge of the area improves. The program also teaches money management. Its lessons in decision making and finance are as valuable as the information about New Zealand that it provides.

The teacher's guide provides a complete listing of all the places the *New Zealand Tours* visit.

Information concerning guarantees, damaged disks and backup disks was not included with the materials I received. However, the Sterling Swift catalog provides a ninety day unconditional guarantee against defects in workmanship or disk malfunction. After ninety days from the date of purchase, any disk damaged for whatever reason will be replaced for $9.95 (with proof of purchase). A replacement will be sent by return mail.

SEARCH FOR YOUR ISRAELI COUSIN

Davka Corporation
$24.95
48K; II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A-	*Value for Money*

Grades: 7 and up

Have you got your bags packed, canceled the newspaper, put the dog in the canine country club, and locked up the house so you that you can make an international journey to Israel? If not, don't fret, since your computer can do it for you in the blink of an eye. Seems that your cousin, whom you've never met, has sent you a letter inviting you to visit her in the town of #@$%%$. Unfortunately, as often occurs in the realm of trans-Atlantic communications, some necessary information has gotten jumbled, and you'll have to search the countryside in hopes of locating her before your seven days are up. Are you ready?

Bit by bit, you take an imaginary trip through Israel and acquire an understanding of the regions as well as the people along the way. This is an effortless, and enjoyable way to learn. In addition, simple instructions and game layout make this educational program one you will want to use repeatedly.

When you first begin, all of the ground rules (no pun intended) are available, as well as the added perk of being able to jump right into game play. Accompanied by some lovely color and musical enhancements, you arrive at either Tel Aviv or Jerusalem airport and are off and running in quest of your cousin.

The press of the space bar or a number moves you through most stops and the "Y" and "N" will answer the questions. For that matter, the only other keys required are those that are needed to type in your name when you start, and the Return key. This is definitely a one-fingered typist's dream.

Anyway, to get on with the saga ... as you travel, a road map that's provided with the package shows you the way. To give you further hints, the map is marked with possible sites at which to look for your cuz, as well as points of interest. When you make a stop, you receive a short description of the area. Mark this information down since the next time you pass through, you may be given a different hint. At this time, you can ask to reread the important parts of your cousin's letter. If you think you are close to where she is, you can try to call her. Unfortunately, you've got to get off the bus to do this, thereby losing a whole day of travel time.

WHERE IN THE WORLD IS CARMEN SANDIEGO

Broderbund
$39.95
64K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

Grades: 7 and up

Where in the World is Carmen SanDiego is an educational game that combines elements from graphic adventures, mysteries, and trivia games to introduce players to world geography and deductive reasoning as they stalk members of Carmen SanDiego's gang. For example, in one scenario, Canada's Stanley Cup is stolen one night in Montreal and you are hired to recover it. It is Monday morning and you have until Sunday at 5 p.m. to find it and arrest the criminal.

Investigation is the prime technique of a detective's work. Clues can be obtained in each city from any three locales such as the bank, marketplace, library, hotel, airport, waterfront, or palace, in this menu-driven game. You might find out that the criminal checked out a book on Buddhist Temples, or he changed his money to dinars. Sometimes you find that the suspect has a tattoo or wore a ring, that he left on a ship that flew a red and white flag, arrived in a limo, or played tennis at the sports club.

To help the student learn which countries might have Buddhist temples in them, or which country uses dinars for currency, the game comes with the 1985 edition of the *World Almanac and Book of Facts*. The center section has a colorful chart of each country's flag, and a section following has complete descriptions of each country, including the local currency. The game is limited to thirty countries. An Interpol Map shows you that Port Moresby is in Paupa, New Guinea, and Moroni is in Cormoros (formerly Madagascar). Sometimes a dictionary helps, especially if the clue says that the thief checked out a book on Sanskrit and you need to find out what country that pertains to. Often, you can eliminate one or more of the three or four possible destinations based on your own knowledge, but not everyone is aware that Budapest is on the Danube River.

Once you have found several characteristics of the suspect, you can enter them in the Interpol computer and obtain an arrest warrant. Sometimes it takes as many as four out of a possible five characteristics to narrow the choice, but usually three clues suffice. You lose precious time each time you use the Interpol computer, so be sure you have enough information when

you go there. If you manage to catch the criminal before they issue you a warrant, the criminal goes free.

Each player begins at the Rookie detective level, and advances through five levels to Ace Detective as he successfully solves cases. On the three beginning levels, there is plenty of time to solve the case even if you make a mistake and travel to the wrong city, but on upper levels time goes faster and clues are more obscure. One wrong turn at the Ace level and you run out of time. If you discover you have traveled to the wrong city, it is best to go directly back to the previous city and try again. Otherwise, you may get hopelessly lost.

This game is quite entertaining, is simple to use, and has good graphics. There is enough randomness built in so that you get a new game each time you play. While it only touches on a smattering (thirty) of world geographic locales, its intriguing game will entice students to learn more about the world.

U.S. GEOGRAPHY QUIZ

Queue Intellectual Software
$29.95
48K; II/II+/IIe/IIc

Overall Rating	B-	C	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	B-	*Value for Money*

Grades: 7-9

Although the package and disk label proclaim this to be a United States geography program, the title on the documentation, *American Geography Quiz*, is more accurate. The program has seven U.S. modules and three on the rest of the continent (Canada, South America, and Central America and the Caribbean). As either title indicates, it best functions as a test or review of geography, rather than as a tutorial. The fact that it responds to mistakes with correct information, however, means that it could be used along with a class text to fill in any gaps.

The format is multiple choice. Once the student chooses a regional module, he answers questions about the location of major cities, natural features, states, and provinces or countries. The questions seem to be randomized. The student receives only positive reinforcement, and, at the end of a given module, a score listing the number of question he attempted, the number correct, and the percentage right. If the student quits in the middle of a module, the program suggests beginning with that module the next time he signs on. When a student returns to a module, the program begins at the place where he exited.

The teacher can access a management program to get a screen or printout of all student records or individual records, each of which shows the percentage correct for each module. There is room for ten student's records on the disk, so large classrooms will have to use it in shifts.

The documentation with the disk is quite clear. Each disk has a toll-free number for technical assistance. Since my first disk had a defect, I called the number, returned my disk, and received a new one within a week. In addition, Intellectual Software will replace any subsequently damaged disks for $3. This policy, and my experience indicate that purchasers can expect outstanding support.

STATE CAPITALS

Ventura

This graphics-oriented state capital tutor is part of Ventura's *Learning Potpourri*. For a complete discussion see that review elsewhere in this section.

Religion

ALL ABOUT CHANUKAH

Davka Corporation
$29.95
48K; II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	B	*Value for Money*

Chanukah is a celebration and commemoration of the victory of the Jewish people over their enemies and of the miracle of keeping the Menorah lit with only one jar of oil. All of this, and more, will pass before your eyes as this program takes you step by step through the story of Chanukah.

All About Chanukah is presented in an easy, straightforward manner. With a minimum of key presses, you move easily through the nine opening menu selections. Each covers a general topic; you press a numbered key to select one. The program loads that section and displays a screen of information. When you finish reading it, you press the space bar to see the next screen, and so on until you finish the section. Then the program returns you to the main menu.

The nine categories offer a fairly complete explanation of the holiday. Facts about Chanukah offers general facts. Chanukah Menorah discusses the menorah and how it is lit and cared for during the holidays. Story of Chanukah is an interesting text/graphics presentation giving an encapsulated version of the Chanukah story. Chanukah Blessings describes the blessings commonly used. Customs of Chanukah describes customs observed during the holidays. Chanukah Quiz is a very good test of how much you've learned. It keeps track of how well you've done and gives you the correct information when you err. Dreidel Game simulates the traditional game with an animated four-sided top, complete with the Hebrew letters "N"es, "G"adel, "H"aya, and "S"ham (meaning "A great miracle occurred there"). Words of the Sages consists of attributed short sayings dealing with Chanukah. The ninth option is Quit, which returns you to Applesoft.

This program is not difficult for anyone to use, as long as they can read and press a key with one finger. On a color screen, the graphics are bold and colorful, but not overdone. The music is only presented at the onset of the program, so I doubt it would interfere in a classroom setting. And, try as I might, I couldn't disrupt the program by pressing keys while it was running. With such a fail-safe program, even complete novices can learn without risking damage to the disk.

The material covered is complete and easily worked through. Purchasing this disk for yourself, however, would be wasteful, as it is ideal for classroom use. One person can work through the complete disk in under an hour not counting review periods. So why not make the best use of today's materials in learning yesterday's facts?

ALL ABOUT PASSOVER

Davka Corp.
$29.95
48K; II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	A	*Value for Money*

As the name suggests, this program provides all you need to know about the feast of Passover. The selections offered are: Passover Facts, Passover Practice Levels 1 & 2, The Sedar, Passover Customs, Passover History, Quizzes—Basic and Advanced, Sedar Sayings, and Thought Questions.

Once you make your selection, you are led through a well-planned educational experience. You learn the difference between both leavened and unleavened bread (chametz), the matter of "Biur Chametz," the Sedar ceremonies, and the reasoning behind them, as well as passages from the Bible giving references and stories related to the holiday. The program gives in-

depth explanations of songs, such as "Dayenu," and invites you to sing along with a lively, bouncing ball to help you.

The questions on the two different quizzes check your knowledge and show you possible areas for improvement. Both the basic and advanced quizzes grade your responses to twenty questions each. If you give the wrong answer, the program supplies the correct response. The last section, Thought Questions, doesn't involve right or wrong answers. It presents you with challenging questions designed to make you think.

Information is mostly supplied in text form with interspersed graphics—and even an occasional game or two. The screen layout was composed with a kind of graphic editor so that added forms of script are available. This also provides for good display quality on both color and green-screen monitors. Though I didn't try it out on a standard television screen, I feel you would still receive the same high quality. As you move through the various screens of information, you can return to the main menu at any time. Bits of music hold the interest of younger students. Pictures are presented in excellent color and some even have animated segments.

The program has excellent error-trapping, and is very user-friendly. It won't even let you put in the wrong side of the disk. All of this for only $29.95!

ALL ABOUT PURIM

Davka Corporation
$30.00
48K; Apple II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	C	B	*Value for Money*

What you always wanted to know about Purim but were afraid to ask. Well, not quite, but *All About Purim* provides a nicely packaged educational program on Purim for people of the Jewish faith: where it comes from, how Jewish people celebrate it, and its background and significance. Now, if you're expecting another boring educational program, forget it. As you "work" your way through one double-sided and one single-sided disk, you find yourself doing everything from playing games to reading words of the Sages. To help keep track of disk sides, Davka provides a menu on each. After you choose an option from the menu, the program tells you which disk and side to place in the drive.

The menu presents nine options. Purim Facts gives you the major facts and customs of Purim, one step at a time. Purim A to Z takes you step by step through important names, customs, and characters arranged in alphabetical order. Purim Customs includes short melodies from the Meglillah. A short Purim Quiz tests your knowledge with twenty multiple-choice questions. Words of the Sages brings you words of wisdom from Talmudic and Midrashic sources. The last four sections provide a bit of color, whetting your interest while adding a bit of fun. Purim Story tells a story with rhymed verse and color graphics. Purim Word Scramble has you working to unscramble words before your time runs out. Purim Tele-Grahms sets rhymes about your favorite teacher to a tune. What's Wrong with this Picture? asks you to pick out those parts of a color screen that don't match the time period. I enjoyed this last section the most.

The authors made an effort to mix color, sound, and games to hold your interest, which they do. You move through selections by pressing the space bar, which makes the program easy to use, and you can exit at any time by pressing the Escape key, which returns you to the menu. Excellent error trapping and reliable performance combined to contribute to an enjoyable and educational experience. Depending on what you're looking for, you'll be either enthusiastic or at least warmly appreciative of *All About Purim*.

BIBLE BASEBALL

Davka Corporation
$24.95
48K; Apple II+/IIe/IIc

Overall Rating	B-	Medium	*Challenge*
Creativity	B-	B-	*Graphics*
Documentation	C	B	*Value for Money*

After Noah got off the ark, did he become a part-time prophet, continue to build boats, or take swimming lessons? The correct answer could win you a home run, a double, or a pop fly to one of the fielders in this baseball game in which your answers to the questions determine the outcome. To make the game even better, you can add your own questions.

Bible Baseball both educates and entertains. The opening section gives you a few choices, letting you choose to tackle the major league section if you know the Bible well, or struggle along with the minor league

unit (as I did). You can also depart from the regular questions by inserting your own data disk when that option comes up. If you decide to continue with the standard game, you hear some excellent sound effects, specifically crowd noises with vendors offering their goods. You can pit your efforts against the computer or another worthy (human) adversary.

A Hi-Res playing field shows the bases, pitcher, batter, and warm up areas. A section of the warm up area tells you who's up to bat. After the pitcher throws the ball, a question appears at the bottom of the screen. The questions involve different biblical points followed by a varied number of possible responses (up to six) in a multiple choice format. An incorrect answer means an immediate out. A correct answer may mean you win nearly anything possible in a normal game, including a line drive to third base. The questions range in difficulty according to the league you choose, but some are exceedingly difficult.

A Create-A-Quiz disk allows you to add your own questions on a separate disk, up to 200 questions per disk with no upper limit to the number of disks, which means that you can add questions on any subject as you wish.

Given all this, could anything be wrong? Yes. You can say it in one word: speed. The program accesses the disk to pull out questions and answers from a text file, which means a delay between question and answer. Other than that, the game is both interesting and challenging, a good buy for anyone interested in the Bible and baseball.

BLESSING-TORAH AND HAFTORAH

Davka Corporation
$25.00
48K; Apple II+/IIe/IIc

Overall Rating	C	C	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C	*Value for Money*

If you need a bit of help on learning Blessing of the Torah and Haftorah, just follow the bouncing square and the notes as well, of course. This simple program takes little explanation. You get four options with a total of three keypresses: the Torah or Haftorah in either English or Hebrew. When you choose the English version, you see the Blessings a word or two at a time, separated into syllables. A bouncing, low-resolution square appears over the section sung while the computer generates the correct tone. You can control the speed of the program by choosing a speed during the initial set-up. After that, the computer takes over and moves you through at the speed requested. You try to match your tone and speed to that of the computer, following the beat and pitch set by the bouncing square. The Hebrew version uses Hebrew words but otherwise follows the same format. With the help of Apple's DOS Tool Kit, the program places the easily read characters on the screen quickly.

After completing each section, you return to the starting menu. Everything runs smoothly by itself, allowing each student to start and run the program at his or her own pace with little need for extra instruction. This makes the program ideal for self study or even classroom instruction.

You really don't need documentation, but a hard copy listing of the Blessings covered within the program would allow others to follow along even if too far from the screen to see. I found no flaws to detract from the program's appeal or educational value.

BRACHOT BOXES

Davka Corporation
$25.00
48K; Apple II+/IIe

Overall Rating	C-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	D	C	*Value for Money*

The purpose of this classroom-oriented program is to help students memorize the various Jewish "blessings" for foods while providing a bit of competition. The basic format is simple and extremely easy to master—especially if you have ever played tic-tac-toe.

After a short introduction, the program asks if you would like directions. If you do, it instructs you on the make-up of the teams and the importance of remembering the team names. Then you move on to the main program. The playing board is a three-by-three square grid, with numbers from one through nine inside. Prior scores are displayed on the bottom of the screen (to bring you up to date on past games) just before the first question is asked.

You are given the name of a type of food and asked which of the six blessings (Hamotzi, Mezonot, Ha-etz, Ha-adamah, She-hakol, or Ha-gafen) you would use. The food could be anything from Boston cream pie (Mezonot) to raisin wine (Ha-gafen). If you choose incorrectly, the next team is asked to press the space

bar to continue. A correct answer allows you to place your mark, either a 0 or an X, in any of the open areas. (Following the standard rules for tic-tac-toe, three marks in a row win.) The computer also adds another point to your team's score and asks you if you would like to continue. You can either return to the game or see a final point total for past and present games before quitting.

Although there are some instructions at the beginning of the program, there is not even a hint about what each of the blessings mean. After playing a while you start to see a pattern, but if you don't know what the blessings mean, good luck. I couldn't even find them in a Jewish dictionary. There should be enough information in the documentation or within the program, so that outside resources are not necessary. While the program does give you practice with identifying the proper blessings for a wide variety of foods, one wonders about the propriety of reducing such sacred matters to a game of tic-tac-toe.

CRUMB EATER

Davka Corporation
$24.95
48K; II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	B	B-	*Graphics*
Documentation	B-	B	*Value for Money*

Although it has a silly name for a Jewish educational game, *Crumb Eater* turned out to be extremely interesting and somewhat addictive. Passover is coming and you must eat all the crumbs and slices of bread before you run out of time. (Preceeding the festival of Passover, all bread must be removed from a Jewish household and only matzoh, or unleavened bread, may be consumed during the holiday.) You can stop and earn an extra five seconds of time by correctly answering questions concerning Passover, which means that you learn about Passover as you try to keep playing.

The game section consists of levels that gradually increase in difficulty. The first level presents an empty square within which crumbs appear randomly. You have five seconds (computer time) to reach and eat the crumb before you lose two points and a second crumb appears. You control a bird's beak with the keyboard to gather the crumbs. Woe be it if you bump into a wall or partition—a block appears magically and transports you to a randomly chosen area of the playing field, plus you lose five points. When you start, you have the option of setting the speed of play from one to nine, with one the ideal learning speed and nine best suited to experts with the fingers and wit of a magician.

The questions concerning Passover prove moderately difficult, but there are a limited number of them, randomly chosen. You may well see the same or a similar question asked within a short period of time. This keeps your mind on the questions as you try to remember the answer for the next time the question pops up.

I found the game enjoyable and learned many facts about Passover. All in all, I thought *Crumb Eater* well worth the time and money you would put into it.

GAME OF THE MACCABES

Davka Corporation
$24.95
48K; II+/IIe/IIc

Overall Rating	C-	Easy	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	B-	B	*Value for Money*

Although listed as a game, *Game of the Maccabees* serves just as well as a simple and enjoyable tutorial on the customs and observances of Chanukah. After answering a certain number of questions, you should be able to play an arcade-style battle between enemy warriors and the Maccabees.

When you boot the disk, you go immediately to the multiple choice question section. Correct answers earn you Maccabees, members of a Jewish family who fought a guerrilla rebellion against the Syrians. You can choose the beginning or advanced level, which regulates the difficulty of the questions. The documentation provides most of the story underlying the questions and thus the answers. When you have answered enough questions, you can continue to accumulate more Maccabees or go to the game. A Hi-Res screen loads and the game begins.

The game is extremely simple. It consists of one Maccabee on the left side of the screen and four Syrian warriors with altars on the right. The Syrians fire arrows in a random pattern while guarding their respective altars. The Maccabee moves up or down upon command, throwing spears. You try to kill all of the Syrians and destroy their altars without running out of Maccabees. You can press Escape at any time to go back and answer questions to earn more fighters.

As I said before, the program was more educational than entertaining. It didn't take long for the game to lose its interest. As far as the age group it suits best, I would estimate from grades six and up because of its educational nature.

HAFTARAH TROP TUTOR

Davka Corp.
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	A	*Value for Money*

I doubt that the prophets ever envisioned that someday a computer would be used to teach the chanting of their writings in the Haftarah. Leave it to Davka to find a unique, educational, and entertaining way of doing it.

Haftarah Trop Tutor subdivides the learning process into eight separate units, each focusing on a group of *taamim* corresponding to the standard musical notes sung for the reading of the Haftarah. Within each unit, the student is first introduced to each *taam* in the group individually by listening to the computer sound out the corresponding musical notes while watching a bouncing ball go over each syllable. Following this introduction, several examples of each *taam* are given using words written in Hebrew and their English transliteration. Further reinforcement is provided by including a "find-the-*taam*" exercise in which the particular *taam* or *taamim* being studied must be correctly selected from a group of words containing other *taamim*.

Ideally, the student would start with the first unit one since the program is designed to proceed in a step-by-step fashion with each unit building on the previous ones. However, the student may enter on any level. Simultaneously, he can escape from a particular unit (by pressing Escape) at any point once he feels he's familiar with that lesson. The program is quite flexible, allowing easy entry to and exit from each unit as well as the ability to continue (by pressing the space bar) or backtrack (by pressing the left arrow key) within the unit itself.

A four-page, typed manual is included but is really not necessary since the program itself is menu-driven and contains easily understandable directions. Furthermore, the program is flawless in execution.

While not intended to replace the Bar/Bat Mitzvah teacher, *Haftarah Trop Tutor* is sure to make his job a lot easier by allowing the student the opportunity to reinforce at home lessons learned in Hebrew school. There is no better way for the Bar/Bat Mitzvah student, or anyone for that matter, to develop the necessary reading skills for chanting the Haftarah. Davka has once again put forth a valuable aid for Jewish education.

THE HIGH HOLIDAYS

Davka Corporation
$30.00
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	C	*Value for Money*

The High Holidays combines information on two high holidays of the Jewish faith: Rosh Hashanah and Yom Kippur. Information about and music of Rosh Hashanah make up the first side while the second side covers everything you wanted to know about Yom Kippur. The double-sided nature of the program allows for more instructions and thus ease of use. Colorful Hi-Res graphics and sound routines complement the presentation of the history of the high holidays, the services used, and the sounding of the Shofar. The menu-driven structure allows you to choose your lesson or review material easily.

The first side of the disk, Rosh Hashanah, offers seven choices: Facts about Rosh Hashanah, The Shofar, Facts about the Rosh Hashanah Service, Introductions to the Service, Customs of Rosh Hashanah, Rosh Hashanah Quiz, and Words of the Sages. You can easily step through each section or exit without complication, which keeps mistakes to a minimum while allowing you to make the most of your time. The program details the sounding of the Shofar both visibly and audibly and employs liberal use of Hebrew as a further educational tool for interested students.

All about Yom Kippur follows the same pattern, but deals exclusively with Yom Kippur. Again, sound, graphics, and color provide an interesting and educational backdrop for the information presented. The menu offers six selections: Facts about Yom Kippur, the Yom Kippur Service, Selected Prayers of Yom Kippur, Yom Kippur Practices, Yom Kippur Quiz, and Words of the Sages.

As in most of the programs belonging to this series from Davka Corporation, the error trapping is excellent. The Hi-Res screens, even for normal printing,

result in easily read and understood text. They also make it possible to mix Hebrew and English on the same lines, which allows you to compare the structure of each language. Words of the Sages provide insight into the thoughts of some important religious leaders. The quiz, though limited, helps you check your knowledge both before going through the program and after, to measure your improvement.

HOW TO CONDUCT A SEDER

Davka Corporation
$30.00
48K; II+/IIe/IIc

Overall Rating	C+	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	C	C	*Value for Money*

The Seder is a Hebrew ritual conducted during Passover in conjunction with the particular version of the Haggadah used at the in-home Passover service. Davka Corporation developed this program for use with formal instruction or as a refresher course. Both sides of the disk offer colorful graphics and sounds to keep students interested. In that respect, they have done quite well.

The first side divides into five main sections preceded by an introduction. The Introduction begins with a swirl of sounds from *Kadesh Urchatz*, a song used to help students learn the different steps of the Seder ritual, and a Hi-Res display of the Seder plate. The rest of the first side describes the first five steps of the ritual and places them on the plate: the Kadesh, Urchatz, Karpas, Yachatz, and Maggid. Usually, you see both Hebrew and English translations, which allows the instructor to demonstrate the proceedings.

The second side begins with the Rachtza, the second ritual washing of hands, followed by the rest of the fourteen steps. Again, the program displays each step with color and sound as it continues to tell the story of the Seder. Motzi Matzah, Maror, Korech, Shulchan Orech, Barech, Hallel, and Nirtzah (the conclusion) finish off the rest of the steps of the Seder. After you've completed all the steps, you have two final options, both of which help you complete the training unit and round out the information presented. A Seder quiz checks each student's knowledge; you could also use it as a pre-test. The Song session covers music such as *Adir Hu, Ki Lo Naeh, Chad Badyah,* and the music and English transliteration of the Kiddush.

How to Conduct a Seder deals with the Seder in depth, as its name implies. The programming is very good and the error trapping, excellent. If you just want to find out more about the Seder, try some other method unless you're familiar with Hebrew terms and logic. The sheer number of these make it difficult, if not impossible, to do it on your own without assistance from some knowledgeable person. For classroom use or with a tutor, you probably can't find a better way to learn about the Seder. One last note from the documentation: "Please remember—to be most effective, *How to Conduct a Seder* should be used in conjunction with your Haggadah!"

JEWISH I.Q. BASEBALL

Davka Corporation
$24.95
48K; II+/IIe/IIc

Overall Rating	B-	Medium	*Challenge*
Creativity	B-	B-	*Graphics*
Documentation	C	B	*Value for Money*

With the crowd cheering, the flag waving, and the facts stored on disk, the teams man the field for a round of wits. The pitcher chooses the right question, winds up, and pitches the ball. The first question: "Which city has the largest Jewish population?" I chose New York. It's a hit! The ball soars, only to get caught by the shortstop. Just wait until the computer comes to bat.

A game, yes, but this game combines learning, action, plot, and some downright difficult questions on different subjects concerning everything Jewish. The program reponds to each correct answer with a value: home run, triple play, double, double play, single, or whatever. A wrong answer results in an automatic out (no strikes). You can play against the computer or against another person. If you're really good, you can even retire your opponent's pitcher. The questions don't repeat very often, but if you do finish them (or just get very good at answering), you can use the second disk enclosed with the program to add questions of your own choosing. You may include questions on any subject, up to 200 at one time, and give them different degrees of difficulty to get higher scores. You can't designate questions as either major or minor league (as they are on the original disk), but you can fix up yet another disk with harder (or easier) questions.

The documentation covers all the necessary material on adding further questions and correcting them. The

Official Rules card covers all fourteen pieces of information that you need to enjoy yourself to the utmost. The possible reponses are well error-trapped to take care of all those mistakes and wrongly pressed keys.

As in all similar games from Davka, the questions and answers can make or break your enjoyment of the program. The action, although pleasant and colorful, might well become repetitious after long use.

JEWS IN SPAIN

Davka Corporation
$35.00
48K; II+/IIe

Overall Rating	C	D+	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	C	*Value for Money*

So, you want to know more about the Jews in Spain? You could go to the library and hunt through quite a number of books to gather bits and pieces of information. On the other hand, why not grab a comfy chair, and sit down at your computer to receive a comprehensive view of all the relevant information by merely pressing one key?

Quite a bit of information is packed into this package. Side One deals mainly with the history of the Spanish Jews. This is divided into sections, or periods, starting with the arrival of the Romans in Spain, and continuing to the Inquisition at which time the Jews were expelled. To make the presentation both dramatic and more understandable, a hi-res screen steps through a display of a time line showing the rise and decline of the Jews. You also have access to a colorful map indicating areas where the main Jewish populations were located. A separate history of the decline of Spanish Judaism is covered in Section Two with many screens offering detailed information. Once you have studied your subject matter, you can go on to one of two available quizzes. Additional features of Side One include a list of famous Spanish Jews, and three screens of bibliography—an extremely helpful list for students who wish to pursue the subject further.

Side Two contains information and selections from three famous Spanish Jews who were men of letters: Judah Halevi, Moses Maimonides, and Isaac Abarbanel. Biographies of all three are listed separately on the main menu. Selections from Halevi's poetry, selections from the "Kuzari," the "Guide," Mishnah Torah, and Abarbanel's *Commentary* are provided. To complete it all, a quiz is included covering the works of these literary figures.

I ran into a few problems that deserve special mention. Depending on which programs you run first on Side One, you will encounter intermittent bugs. During one of the quizzes, if you answer a question incorrectly, you will get a lowercase character instead of the flashing number of the correct answer. (This quirk was noted on the Apple IIe version, but not on the II+.) A similar problem occurred during one section of the graphic display where "-" turned into "m."

Another problem (at least to my mind) involves the menus. Menus on both sides of the disk were crowded, almost cluttered. Also, when you use the Exit option on Side One, you are advised that Side Two holds a series of selections. However, you're then dropped out of the program and are left with a BASIC prompt! It would be much more user-friendly to ask you to turn the disk over and press any key to continue.

Most of the information presented by *Jews in Spain* is entirely textural in nature. On Side One, the Short History (their term) actually is quite extensive. You are allowed to return to the menu at any time, but there's no way to start at any point other than the beginning. Since you have to wait for each screen to load from a text file, you are unable to quickly find information that's supplied later.

There is certainly room for improvement in this program with regard to the way it operates. However, if your answer to a quiz question is incorrect, the program's method of displaying information is outstanding. As far as the text material is concerned, it is exceptional in its depth and subject matter. If you want to use *Jews in Spain* for class instruction, it is a sound choice. I guess what all this boils down to is this: if you don't mind putting up with some of the minor operational drawbacks, the program sure beats having to research all of the separate references yourself.

JUDAISM AND CHARITY

Davka Corporation
$25.00
48K; II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	A	C	*Error Handling*
Documentation	C	C	*Value for Money*

Judaism and Charity provides a course of text material on Jewish attitudes on charity and the beliefs of some of the famous teachers of the past. Sayings, insights, and bits of humor combine to teach the mate-

rial. It's hard to avoid jokes about money and how it never leaves Jewish hands, but this educational program uses many of the sayings from the past as well as the present to teach the meaning of charity and how you can comfortably live within that tradition. Best of all, it does so with an ease that you can understand and enjoy.

After starting the program, you get a menu with five choices. You can study charity by source material or by author. You can also examine the bibliography, study a summary of the material, or quit the program. If you choose to study charity by source, you can choose selections from Biblical, Talmudic, Post-Talmudic, Hasidic, and (my favorite) Folk categories. If you choose to study charity by author, you have your choice of twenty-four who mention and teach concepts concerning charity. Both units let you start from the beginning, continue, return to the Main Menu, or end the instruction. You can choose what to do at each screen, making it easy to step through or even restart a section. Each screen of information gives you the information plus the source or author.

With the material stored on disk in text file form, there's some delay in the appearance of new screens (although not long enough to be annoying. The program is purely educational and not meant to entertain except inadvertently. In fact, without the lighthearted edification of some of the selections, I would have found it difficult to remain interested in the studies. Although you could learn this information just as easily from books, the program doesn't cost much and doesn't take much room to store. It's also easy to use and it helps you understand the Jewish faith and charity.

JUDAISM AND PRAYER

Davka Corporation
$25.00
48K; Apple II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	C	*Value for Money*

What you have here is the no frills basis for classroom instruction and learning, devoid of such additions as music and color. A student of Judaism can sit down at the computer and press a few keys to display a large selection of material to study and master. In this case, the software concerns prayer and its relationship to the Jewish faith.

Once into the main program, you choose from a menu of alternative approaches to the information on prayer: by sources, by author, a bibliography on prayer, a summary on prayer, or how to exit. The two main sections allow you to choose source or author, study, and review before continuing. Sources consist of eight different selections ranging from Biblical and Talmudic to the Shemoneh Esrai. You proceed at your own pace and can exit to the Main Menu at any time. Authors presents selections from eight authors well known for their thoughts on prayer and Judaism, such as Baba Batra, Berakhot, and Bereshit Rabbah. If you want more information, the bibliography gives you two full screens of sources of material. When you conclude your studies, the program queries you on suggested changes or additions and tells you the address to contact to accomplish them.

Although the program presents its information smoothly and relatively quickly, I found it rather dry, even slightly boring for individual study. No quizzes or interaction with the computer help keep your interest. You might as well just print everything out in a book and save the cost of the computer.

PURIMAZE

Davka Corporation
$25.00
48K; Apple II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	B-	C	*Value for Money*

Sure, I know there're plenty of maze games around, but how many throw in the twist of having you answer questions to earn more moves, or add random penalty/bonus points to make things a bit more interesting? Just add a game of Hangman and you're all set—if you know your facts on Purim.

This game combines fun and learning. You must answer questions as you move through the maze because you don't have enough moves to reach the exit otherwise. A correct answer wins you an extra ten moves, with no upper limit on how many you can collect. You may need them as a result of the random penalties and bonuses that add suspense to the game. Just press the Escape key at any time to enter the question and answer mode. A limited number of questions test your knowledge of Purim and related facts, which means that the questions tend to repeat fairly

frequently. This promotes your retention of the knowledge and speeds the game along.

The second game, Hang Haman, looks exactly like any other Hangman game except that the figure is drawn in Hi-Res graphics. When you start the game, you can enter your own words into memory or use the default words (related to Purim). Unless you already know something about Purim, you'd better put your own words to use. Words appear randomly. At times, the program uses multiple words or names. Your score depends on your speed and accuracy. The longer you take and the more wrong guesses, the lower your numerical score.

The two games in this package combine entertainment and some education, but I don't know if most people would spend much time on them. They don't have the pizazz of an arcade game or the depth of an adventure, but if you want to learn about Purim and enjoy yourself doing so, then they're worth it.

SUKKOT

Davka Corporation
$30.00
48K; Apple II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	C	*Value for Money*

The Jewish holiday of Sukkot celebrates life and the harvest. *Sukkot* explains this holiday and describes how and where it is held.

When you first run the disk, you see a colorful picture of a Sukka (a building constructed of things grown and harvested) and hear the music of the holiday. The following menu gives you six choices. (1) Facts About Sukkot offers short descriptions of the holiday, when it started and how it's celebrated. (2) The Sukka shows you how to build a Sukka, with well done graphics and color. The program gives you hints and suggestions on building the Sukka, plus the reasoning behind each step. (3) The Four Species tells you about the materials used in construction, such as willow and myrtle wood, and tells you the proper construction of the Etrog and Lulav, used throughout the Sukkot holidays. (4) Shmini Atzeret and Simchat Torah describes the holidays held immediately following the week of Sukkot. During this time, you must do no servile work; you also complete the yearly reading of the Torah. (5) Sukkot Quiz checks your knowledge of the lessons already covered. (6) Words of the Sages offers a compilation of words of wisdom referring to Sukkot.

I noted a problem only in section one. During the review of the facts about Sukkot, the displays remain on the screen for a relatively short time. You advance at the speed chosen by the program, not at your own speed. A normal reader would have little problem, but a slower reader might well miss more than they read.

For obvious reasons, the material covers a limited amount of information. You can complete the entire lesson in close to an hour. If you want to use the program for more than one student, say in a synagogue, you would soon pay for the program in the time saved in explanations. It also succeeds in maintaining student interest in the Sukkot.

TANNAIM AND AMORAIM

Davka Corporation
$25.00
48K; Apple II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	C-	C	*Value for Money*

This educational program covers quite a bit of information concerning who some of the famous Jewish rabbis were, and when and whence they came from. It follows a quiz format in two parts. The first part tests your knowledge with multiple choice questions. You see the names of two rabbis and must determine if they belonged to the same generation. Next, you must decide where they lived—Eretz Yisrael or Bavel, then Sura, Pumbedisa, or Nahardea. The last question requires you to choose the relationship between a specific rabbi and the others listed, including whether one was a disciple of another. The program chooses each set of two names randomly, so you won't always see the same series of rabbis.

The second part tests your knowledge of the linearity of one rabbi to another—did he live before or after? You see a time scale on the left side of the screen, starting at the top with the year 0 CE and ending at the bottom with 450 CE. One man's name appears at the right along with the period in which he worked. You must place an arrow at the year (using the "I" and "M" keys to move the cursor up and down) in which a second rabbi worked.

Overall, I thought the questions extremely narrow in scope, dealing only with a small base of questions. You get points for correct answers, starting with five points

for the easiest questions. A running tally tracks your status during the test. You can also exit from the test, continue with the first part, or quit occasionally. You do not have to stick with one section of the test. The only graphics consist of a low-resolution depiction of a rabbi at the beginning, plus two busts of rabbis at the top of the screen during the entire first part. Everything else takes place on the bottom portion of the screen.

This program disappointed me mainly because of its limited scope. It covered a range of people that few of my Jewish friends had even heard of. Moreover, its ability to hold your interest leaves much to be desired. On the other hand, if you have to learn this material (for whatever reason), why not let the computer do the work? Just sit back, get your finger ready, and.... Now let me see, was he really with the Pumbedisa group or some other?

TEN COMMANDMENTS AND SHAVUOT

Davka Corporation
$30.00
48K; II+/IIe/IIc

Overall Rating	B-	C-	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	C	*Value for Money*

Sure, most people know some of the Ten Commandments and some even know the story behind them, but with this program you can learn facts and customs about the Ten Commandments and Shavuot if you take your time with the games, graphics, and easily understood text presented in *Ten Commandments and Shavuot*. The program comes on a double-sided disk which you can boot on either side. After you choose an option from the menu, the program either displays your choice or directs you to turn the disk over. This saves you from starting all over if you boot up the wrong side of the disk.

The menu offers seven main options. The first section, Shavuot Facts, is relatively short and you can step through it by pressing the space bar when you have finished reading each screen. The second section, which resembles the first, concerns the Ten Commandments. Section three goes into more depth on the Ten Commandments, with displays, explanations, and commentary on each of the Commandments. The Hi-Res screen compares the Hebrew text with its English translation. The fourth section, Shavuot Customs, explains traditional Jewish customs, such as the reading of the Book of Ruth and the recitation of Akdamut. Section five presents a game on the Ten Commandments in which you match each Commandment to its place on one of the two tablets. Answering correctly results in a chunk of the rock appearing on screen, ending in the formation of the two tablets. The last section quizzes you on Shavuot with a multiple-choice format.

Overall, the program covers its subjects well in as enjoyable a manner as possible. It does have a few problems, though, arising more from the design of the program than from the subject. Twice while I reviewed the program, error messages flashed without any cause noted. Because of the protection system, you can't determine the cause of the problem nor can you devise a way to bypass that particular area. Other than that, I found the program easy to use by people of any age, say from ten up, who need a refresher or education on these subjects.

Music

BASIC GUITAR 1

Digital Concept Systems, Inc.
$49.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	B	*Value for Money*

The package contains two copy-protected program disks; one with a tutorial, and the other with eight "play along" songs designed to accompany the tutorial. It comes with a ninety-day, free replacement warranty, after which a $5.00 replacement charge applies.

Basic Guitar 1 teaches you to play fourteen guitar chords in seven different keys, and instructs you to tune your guitar by projecting appropriate tones through the Apple's built-in speaker. You also learn the three primary chords of each key: tonic, dominant seventh, and subdominant. The screen displays easy-to-follow chord charts in Hi-Res graphics that show the correct placement of each finger on the neck of the guitar. You can either learn the chords in each lesson, or return to the Main Menu for an alternate lesson. The song disk is in two parts: a "warm-up routine" and "play the song". As in the tutorial, the cursor marks time and shows you when to strum a particular chord.

The program is not without faults. For example, once you have started a particular lesson, you cannot exit it without either completing it, or re-booting. The tones played to help you tune your guitar are too short, and pushing the space bar every few seconds for tuning is annoying. Finally, there is nothing to remind you to keep the Caps Lock button down—without that, the program won't operate correctly.

The documentation, especially the appendix, although well-written, is probably too difficult for students below the seventh grade level to use alone. Fifth grade students could use this program, but some initial adult supervision would be required.

MUSIC GAMES

Howard W. Sams & Co., Inc.
$39.95
48K; II/II+/IIe

Overall Rating	A	A-	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Have you ever wanted to learn more about music, but didn't want to read books or go to classes? Here is a way to learn ear training, listening skills, note recognition, and rhythm on your own computer. *Music Games* teaches you these topics with as little pain as possible. All the instructions display easily on the screen. This program features Hi-Res color graphics and full musical note and rhythm reproduction. The twelve programs vary in topic and difficulty. The first program, called Bach the Younger, plays J. C. Bach's well known "Solfeggietto." You are first asked to set a tempo. As the computer plays the song, the key of the song appears.

Hearing is Believing starts with six notes on a treble staff. The Apple plays seven notes and you try to identify the note left out (no accidentals are used). You may listen to the series of notes as many times as you need. You have three chances. The correct note will be filled in after the third miss. You have two options: to leave out more than one note (up to seven notes) and to alter the speed. Memory tests your ability to recognize notes on the C Major and A Natural Minor scales. The Apple plays one of the two scales. You choose how many pitches for the Apple to play at one time. The Apple then plays a series of pitches while lighting up the letter names on the screen. You enter all the pitches until you reach the total. The two options are to change the speed of the notes and to have the notes played unlit (this is a real test). Both programs help your ear training skills.

For Note Recognition you employ Flash Cards, ten cards per session. You can choose to study any of the staffs, including alto, tenor, and bass. Moving on the Staff simply asks you whether the note displayed goes up, down, or stays the same. Note Finder asks you to find a note on the keyboard related to the note on the

staff. Finally, What's My Name quizzes you on the names of all the keys on the keyboard.

Counting Aid allows you to enter a rhythm. The Apple plays while showing you how all the notes fit together. In Measure Count, you try to get in the last note of a measure according to the time signature. The last programs are Rhythms 1-3. They all do the same thing but in progressive difficulty. This was my favorite part of the program. The computer displays a pattern of notes which you have to enter, via the game paddle button, in the correct rhythm. You may enter the notes at any speed you like. After you finish, the computer plays the rhythm correctly and marks any mistakes. I found this a very good and easy way to learn rhythm.

Throughout the program, most correct answers are rewarded with nice little tunes, while wrong answers get a few low-pitched buzzes.

Overall, I think this program is very good for anyone who has played an instrument for less than a year and wants to improve. The disk is copyable and written in Applesoft, so you can make changes.

MUSIC MAESTRO

Springboard Software, Inc.
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Children love music, and they are often eager to learn and participate in making their own music. In order to do this, however, they must know the symbols used to play the appropriate notes. *Music Maestro* (formerly *Early Games: Music*) has been created to introduce children to the piano keyboard and to teach them basic music notation.

The program starts off by displaying the Picture Menu. All eight games are shown one by one on the screen. To begin any one of these activities, all you have to do is press a key when the desired selection is shown. You may return to the Picture Menu at any time by pressing the Escape key. You may also select a game by pressing Control-I to get the menu instructions. Then press a key to get the word menu, and press a number (1-8) to select a game.

Guido's Quiz helps you learn the letter names of the keyboard, treble clef, and bass clef. Pressing the Return key toggles between the three. The full array of names is shown while the appropriate note is played. Then one by one, the letters become question marks which must correspond to the correct letter. When you have mastered these, the quiz becomes more difficult. If you have trouble, hints will be provided. To jump over the easy questions, press Control-J.

Perform/Record/Playback allows you to play, record, and recall tunes. The top row of numbers is used in playing notes. While each note is played, the letter of the note is displayed on the keyboard or the staff of your choice. All tunes can be saved on disk. Kaleidoscope is similar to this game, except that it draws random pictures on the screen while you play. The Return key turns the Rapid Draw on and off.

Melody Tutor teaches you songs by playing the entire tune first, and then playing the notes one by one and having you repeat them. Notes are gradually added on. Numbers are used to help play the correct notes. If you play the wrong note, the Tutor will stop you and you replay that note.

Music Maestro is a colorful and attractive program. It is well conceived and very interactive. Note that this program does not include sharps or flats (you cannot play any black keys). All the commands are easy to learn. The program is completely crash proof, and nothing short of turning off the power shuts it off. The disk is copy protected, and there is a thirty-day warranty.

MELODY MAGIC

Swearingen Software
$34.95
48K; IIe/IIc

Overall Rating	C+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	B-	*Value for Money*

Melody Magic offers a simple method to develop skill in reading and understanding music. The program comes with a detailed manual on what each type of note does as well as how it can be positioned to sound the correct tone. Included with the package is an Easy Melodies song book that has a selection of short, easy songs for you to enter. This way, you get to practice with the system as well as learn the notes. Sound interesting? It could be, but there are some problems.

The documentation says that the program makes learning to read music easy—which is true. It doesn't tell you how it does this, so I will. I was a willing

subject, and within a few hours was able not only to recognize different types of notes, but to tell what the music was supposed to sound like. How does all of this happen? The program allows you to enter in a letter/number combination for the note, such as C4 or A5, followed by the number of allowed beats.

The number of beats is one point of contention. There is a maximum of nine beats possible. With the 1/8th note has two beats. That again leaves the whole a dotted whole note can only have nine beats maximum. To include 1/16th notes, you have to change the speed of the music and double everything so that the ⅛th note has two beats. That again leaves the whole note as the longest note possible. See what I mean? Along with this is the inablity to create ties, used for longer held notes; you start running into problems. Rests are treated similarly: they have a miximum of nine beats—but when they're added together they're the same. After all, if you have no sound, you have no sound, no matter how many rests it takes. Sharps and flats are taken care of by adding either an S or F following the note and the amount of beats.

What did I think of the entire program? I enjoyed learning about music, but the poor sound output from the computer is an almost fatal distraction. Playing music on the computer could help one person learn the sound of the notes, but I sure couldn't see the family sitting around the computer at night playing "sing-along with the bouncing digit." Don't get me wrong—a computer can put out some really fancy music, especially with the addition of a special board. My problem is with the music the program sends out; it's like hearing a neophyte pianist. Each note is played separately, with a distinctive break between notes. Since the music doesn't flow, you get no sense of the fluidity of music. Is it worth the money? That's up to you. It does teach you to read music—it's just not very stylish.

MUSIC READINESS

Sterling Swift Publishing Company
$59.95
48K; II/II+/IIe/IIc

Overall Rating	C-	B-	*Reliability*
Ease of Use	C-	B	*Error Handling*
Documentation	C	F	*Value for Money*

This program teaches you to distinguish high and low pitches, note progressions, and note duration between notes ranging from quarter to whole. It consists of two disks, a student guide, and a parent teacher guide.

One of the disks deals with pitch and the other with rhythm. On startup, you are presented with a menu of four lessons and quit. Pay attention to the instructions after you select an option; you must remember commands such as "S" to start and Esc to get back to the main menu.

Rhythmclown is representative of the four lessons on each disk. You are presented with a clown holding a placard. Notes (all the same pitch) sound from your Apple in a specific, four-beat sequence. Next, those notes appear in sequence on the clown's placard. You are expected to use numbers one through four to answer the rhythmic sequence of each set of notes: 1 = quarter note; 2 = half note; 3 = dotted half note; 4 = whole note. A correct answer gets half a dozen sparkles for the student. An incorrect answer repeats the problem sequence. At the lessons's end the student is given a percentage score and returned to the main menu.

While the concept and the types of lessons in the program are excellent, there are executional flaws which detract from its educational effectiveness. The most general complaint is that it takes too long to do almost everything. The graphics are of excellent appearance, but take so long to load that they detract from the overall program. Rewards for correct answers are sometimes monotonous, and occasionally even the process of giving the answer is confusing. For example, in one lesson you have to give a series of numeric answers that don't appear on the screen.

On one occassion, I answered every question correctly. To my surprise, I scored 111% instead of the expected 100%. Finally, when you choose option five (to exit the program), the screen displays a bass clef graphic and the computer locks up. You have to go through a "cold start", described in the Apple manual, to continue computing. The repair of these mechanical and "human engineering" problems is essential to the educational effectiveness of this program.

Finally you should determine the relative value of $59.95 worth of private music lessons versus $59.95 for this.

SONGWRITER

Scarborough
$39.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

A marvelous educational tool, *Songwriter* helps you gain a visual, tactile, and aural understanding of music in a creative and enjoyable way. Interestingly enough, the program accomplishes this without using standard musical notation and without requiring significant prior knowledge of music. The screen displays a piano keyboard and you create music via a "piano roll" method. Specifically, you move a marker along the keyboard to the desired location (pitch) and depress the space bar to save this note as a "hole" in the corresponding spot on the piano roll displayed above the keyboard. Repeating this procedure creates a musical composition whose relative pitch from note to note depends upon the left-right movement of the pattern of holes. You can play the composition at any time by pressing "P," which causes the piano roll to scroll vertically down through the keyboard. You assign the duration of any note by pressing a number key proportional to the desired time value prior to saving the note. Information about note length appears in a fraction bar at the left side of the screen and is recorded on the piano roll in terms of the length of the hole punched in it. You can edit a composition with single key operations, erasing and adding notes. For example, pressing the "X" key erases the note just recorded (the hole displayed just above the keyboard).

Single keystrokes, displayed around the edge of the screen for your convenience, also carry out many other functions such as speeding or slowing the tempo, adding measures to the music, and incorporating rests within the composition. The Get option calls up a menu that allows you to save your song on a separate disk (initialized with the option "Make New Disk"), load a previously stored song from this disk, erase all the notes in your song, display the names of your notes on the screen, or quit the program. Another Get option calls up a collection of prerecorded songs to play for pleasure or learning.

The impressive documentation provides a Table of Contents and an Index of Commands to help you find specific topics with a minimum of fuss and bother. The main part of the manual begins with a "quick start" overview that allows you to quickly familiarize yourself with the workings of the program and immediately start writing and editing songs without further use of the manual. The remaining material presents details of operation written in a clear tutorial manner. Each chapter contains step-by-step instructions for executing a particular function followed by a group of suggested activities that reinforce the ideas just learned. Many of the chapters also provide specific notes for parents and teachers.

Songwriter has excellent error handling capabilities. If at any time you find yourself in a place that you don't understand or want to escape, simply press the Escape key.

I have only one negative comment, concerning the graphics. I would prefer to see a piano keyboard that looks more like the real thing, with black keys shorter and narrower than white keys. Use of a color monitor slightly lessens this disadvantage because the authors have separated the groups of two and three "black" keys into blue and orange ones. When compared to other musical composition programs currently available, *Songwriter* clearly lacks the graphical elegance and polyphonic capabilities of some of the others, but it makes up for these deficiencies by providing an easily-used format for composing music that teaches the neophyte about musical intervals, scales, rhythm, and structure in a truly interactive, educational way.

Games

BACK IN TIME

Blue Ridge Software
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	C	*Value for Money*

Back in Time is an educational adventure for children in which you find yourself in the Jurassic period of two hundred million years ago. In order to get home safely, you must correctly name the dinosaurs that you meet, find a small bone, and solve a few minor puzzles that mostly involve feeding a particular dinosaur something standard to his diet.

This easy game well suits the very young. The documentation names all the dinosaurs that you will encounter (very handy, because you might otherwise find it sort of tough to spell such names of Rhamphorhynchus). The game involves no violence and it's almost impossible to get killed off. You can save or call a single game position to the protected disk at any time.

This game has the right idea for teaching kids, but I can't help but wonder if the material is appropriate for young children, you probably need to learn a lot of other things before they worry about Ornitholestes, Archaeopteryx, Brachiosaurus, and friends.

DRAGON'S KEEP

Sierra On-Line Systems
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A	*Value for Money*

The dragon has caged and hidden sixteen animals all over the neighborhood. The student takes on the task of searching through the house and the surrounding grounds to release the captured critters. The game closely resembles its sister program, *Troll's Tale* (please see that review). Both are well designed to accomplish the same educational goals, employing identical concepts and execution. However, they do not duplicate each other. The six to ten year olds in the neighborhood rated *Dragon's Keep* as highly as *Troll's Tale* and demanded to play it equally as often.

GAME OF THE STATES

Media Materials, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

A series of five games, *Game of the States* teaches you how to locate states, a given state's neighbors, capital cities, and major cities, and how to remember the postal abbreviations for each state. Advanced players learn how to spell state and capital city names.

One or two players can play each game at an easy or challenging level. The easy level typically features a multiple-choice question; the challenging level, a fill-in question in which you must spell the state or capital name correctly. The program doesn't penalize wrong answers as such—you get another chance to choose from the remaining possibilities. You get points for a correct answer up to the second or third try (depending on the level of play). At the end of a given session, the program lists missed questions along with the total score for each player. If you play alone, you can limit the time you have to answer a question. If time runs out, you get a second chance to answer the question. You can also choose the number of states to tackle in a given session.

Game of the States is a carefully designed package, from its clear onscreen and printed instructions to the friendly reminder to turn the computer off at the end of a session. Although the games resemble each other in

topic and display, the layout and pace keep you engaged. State maps, drawn in red, appear at the top of the screen immediately after you've answered the previous question, even as the disk loads the related question.

My five-year-old son has not had instruction in geography, but he has learned to put together a U.S. map puzzle. With help from that map and reading help, he came back to the first game (Name the State) for three days with unquenched enthusiasm. I suggest that Media Materials include a U.S. map with future editions of the game so that players get the whole picture from the start; doing so also makes the game accessible to younger players. For classroom use, teachers may want to introduce students to U.S. geography before the first game, and offer more instruction on the major cities and abbreviations before moving students on to the more advanced games.

The program tolerates input errors well, except for misspellings. Moreover, pressing the Escape key allows you to quit at any time. Media Materials will replace a damaged disk free.

GO TO THE HEAD OF THE CLASS

Media Materials, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A-	*Value for Money*

Media Materials has a winner with this packaging of the popular board game. It follows a straightforward quiz format, with correct answers moving you closer to the head of the class. Each of up to three players chooses one of three levels of questions: Junior (ages eight to ten), Senior (ages eleven to thirteen), and Graduate (ages fourteen to adult). You choose from four answers for each question and get a second chance if necessary. Then the program erases the "blackboard" and the next player's question appears. An element of chance enters in the form of a "luck" desk in each row—but no one in my family ever moved ahead with this desk during the course of several games. One question occurs to me: Is the Senior level programmed for more bad luck desks when played against the Junior level?

The topics range from history, geography, and mathematics to vocabulary and tend to suit the different levels, with few repeated questions. The Graduate level is particularly difficult, as you might expect. Since the program itself does not indicate ages, you might want to suggest a higher or lower level to suit the capability of a given player. Moreover, it is very friendly, addressing questions and responses to players by name. The visual and sound effects are very crisp and well conceived. The action makes the short waits almost unnoticeable once the game is under way. At any point you can stop, restart, or restart at a different level by pressing the Escape key.

Go to the Head of the Class has easy-to-follow directions, both in document and screen formats. A short cartoon at the beginning makes the object and process of the game quite clear. In addition, each phase of the quiz contains prompts. Adults especially will like the last one: "Please turn off your computer." Finally, according to the documentation, Media Materials will replace a disk that gets damaged free.

SPIDE ATTACK

Ahead Designs
$27.00
48K; II

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

In this educational game, one or two players direct a small object called a "spide" with either keyboard or paddles to answer multiple-choice questions posed by the program. Younger players will find the action reasonably exciting, although an electronic pinball wizard may have little trouble avoiding the enemy. Of course, the arcade aspect holds your interest, but the real challenge is to pick the right answer. For the very low price, I think this well designed game an excellent value, especially for the classroom since you can play it on a monochrome monitor via the keyboard and create new questions and answers. You face no limits to the subjects you can cover, from mathematics to foreign languages. You can teach punctuation, parts of speech, spelling, and just about anything else that fits a multiple-choice format. You can also see your students' scores.

The program comes on a single copyable disk. Copies are handy to have when the kids line the hamster cage with your disk, but that doesn't mean that if you have six Apples in your classroom you should make six copies. After all, the publisher is not getting rich charging $24.95 for this program. The package includes a clearly written eight-page manual with instructions

for playing the game and creating new sentence files. You can store up to twenty-six sentence files with up to fifty sentences in each. The game selects twenty sentences at a time to play with. The program enables you to select sound or no sound, display the score or not, select the sentence file for that game, choose between paddles and keyboard, choose whether to employ the little enemy marker which cruises around the screen and can destroy your spide, and record the results of your choices on disk if you do not wish to reenter the information each time.

This attractive game has solid educational value. Because of the customizing feature, you can use it with any age level forever. Already a good buy, the program possesses the excellent added benefit of being copyable, which I consider essential in a program meant for use by small children (but seldom offered by educational programs).

TIC TAC SHOW

Advanced Ideas, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	C+	*Value for Money*

Tic Tac Show, another offering in the Advanced Ideas educational series, provides a straightforward, easy-to-operate simulation of a popular game show. The basic screen features an animated moderator named Carol on the left and the familiar nine-square box on the right. Two players, or a single player against the computer, take turns selecting squares and answering the questions concealed behind them. Correct answers win Xs and Os and the winner, of course, is the first to connect three boxes.

At first blush, *Tic Tac Show* might appear little more than a simple question and answer game program, destined to amuse for a while and then be tossed into the forgotten disk pile. Indeed, it does amuse and its game format—written in BASIC—is well executed, but the many optional features open up a variety of possibilities which make the program a useful vehicle for serious teaching as well as for fun. Too many programs have a 'what-you-see-is-what-you-get' finality to them. *Tic Tac Show*, however, with its ability to add or custom-design subject matter, lends an open-endedness and allows the user to plug in limitless questions ranging from Mother Goose to tensor calculus.

The program comes with an on-board library of fourteen subject areas, such as historical eras, presidents, sports trivia, math, and so on—a fairly comprehensive selection in itself. But the prolonged-use potential lies in the editing functions. Creating a new subject disk involves the use of four control keys plus the arrow keys for writing and editing new questions and answers. Fundamental text editing, yes, but it works well and you can easily save new material to disk. Along with the 'create' ability, there also exist editing options for additions, deletions, alterations, cataloging, and listing the entire subject area, or dumping it to the printer. Also included in the clearly-written documentation are instructions and a schematic for a simple soldering operation which modifies the Apple to shift between upper- and lowercase when you write new subject areas.

The colorful and animated Hi-Res graphics feature sequential flashing lights encircling the name of the game winner. Carol, the moderator, keeps the action lively as well, pointing to the game board, turning her head, and sometimes flipping a coin to determine who gets the last question in the tie (or 'cat's game' version of the program). The optional, playful sound effects feature cheery beeps or disparaging Apple razzes, depending on the answer.

Tic Tac Show is no more or less than it purports to be, an easy-to-run computer tool for entertaining education. You can adapt it comfortably to a wide range of abilities and age groups and, coincidentally, it seems a natural for trivia addicts. Importantly, the program is not 'locked-in'—the flexibility of subject matter and its educational value are limited only by the imagination of those who use it. Could be a little cheaper, though.

TROLL'S TALE

Sierra On-Line Systems
$29.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A	*Value for Money*

Uh oh. The wicked troll has stolen the dwarf king's treasures. The student's noble task: to forage through fields and cavort through caves to recover all sixteen of the pilfered heirlooms.

This adventure game for the young (suggested for seven and up) comes with a partially completed map

and stickers to place where the player finds a treasure. The adventurer finds his or her way through the kingdom by using the space bar (no typing here). Each location offers a Hi-Res picture and three choices of action. The space bar moves the cursor to a choice and the Return key selects it. The troll can pop up at any time to prevent the player from recovering a pictured treasure. A fearsome creature, the troll looks like a cross between a brahma bull and Cindrella's stepsisters at the annual ugly contest. Nonetheless, this felon suffers no violent demise. The adventurer simply runs to another location and comes back to find the troll gone (usually).

Troll's Tale develops reading comprehension and map reading. It goes far beyond these goals, however. For example, my daughter is just learning to sound out words. The lure of treasure and adventure motivated her to sound her way through each of the choices. The program also provides practice in inductive reasoning, letting the child put parts together to make a whole and draw conclusions.

The practice session at the beginning offers the only drawback to the game. It can become very confusing. Luckily, you don't need it and can skip the practice. Otherwise, this is an excellent teaching tool, both powerful and entertaining. The six to ten year olds in the neighborhood gave it very high marks.

Preschool

ALPHABET CIRCUS

Development Learning Materials (DLM)
$29.95
48K; II+/IIe

Overall Rating	a	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Part of the Early Childhood Software series by DLM, *Alphabet Circus* presents the alphabet within a circus setting. The six games on this disk offer a child an enjoyable way to learn the alphabet. All have brilliant color graphics and circus music (which you can turn off if it gets too tiresome.)

Meet the Circus presents each letter of the alphabet in tandem with an appropriate circus picture. Most of the subjects are circus animals (lion, kangaroo, elephant, and so on), but there are others: a juggler for "J," a fire-eater for "F," and a snake lady for "S." The entire alphabet is displayed across the top of the screen and each letter and picture can be called in any sequence by pressing that letter on the keyboard. (These pictures reappear in the other games.)

Alphabet Parade begins by showing the entire alphabet accompanied by the familiar "Alphabet Song." Subsequently, the letters start over again and when the music stops, your child should press the next letter in sequence. An error will bring up a picture for a clue, then the name of the picture, and finally the letter itself.

In Lost Letter, the Ringmaster shows one of the circus alphabet pictures and your child must press the appropriate letter. After five letters, the score is displayed by a seal who is balancing balls representing the number of correct answers.

Secret Letter is a game for two players. The complete alphabet is displayed and the computer "thinks of a letter." Then the first player presses a letter. The computer reveals whether the "secret" letter comes before or after the one that was just chosen. The eliminated letters are erased from the screen and the second player gets a chance to guess the secret letter. Gradually, all letters but the correct one are eliminated.

Juggler requires your child to press the letter on the keyboard that matches the letter and picture shown on the screen. If correct, the juggler catches the letter; if not, he drops it. This continues with random letters until a mistake is made. The highest score is retained in consecutive games to encourage improvement.

Marquee Maker allows you to create words (up to twelve letters long) and sentences (of up to forty letters) which are then displayed, one word at a time, like a billboard sign.

The instruction booklet is clearly written, and includes suggestions on additional activities to vary the child's learning experience. According to the warranty, DLM will replace defective disks free within the first six months, or for a $25 fee afterward.

According to the latest statistics, only about twenty percent of all the five-year-olds who enter kindergarten already know the alphabet. When one realizes that kids can be taught to swim before they can walk, preschool may be the best time to introduce them to computers. Considering the ease with which they control TV's and electronic games, the Johnny's of tomorrow may be able to read—thanks to the computer. With *Alphabet Circus*, they can get a good head start.

BODY AWARENESS

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Body Awareness exemplifies the educational program at the highest level of craftsmanship. Designed for pre-literate youngsters, it completely eliminates

any reading requirement in playing the games and controlling the program. Three miniscreens confront you when you boot up the disk, each representing a different game. An encircling prompt moves from one symbol to the next. Pressing the space bar brings up the game circled by the prompt.

The first game requires you to identify correct placement of body parts; the second, body part identification; and the third, matching of clothing with season of the year. In the first two games, body parts appear with their accompanying word names. In addition to the primary objective, the program teaches beginning word identification/reading skills. Each game displays a series of four miniscreens along the bottom of the screen: a little animated head nodding yes, a second nodding no, a question mark, and a hand waving bye bye. As it occurs when selecting the game, the encircling prompt moves from one symbol to the next. Pressing the space bar chooses the encircled symbol. In case you choose the question mark, a graphic Help display appears. The effect is both ingenious and delightful.

Little graphics of wrapped presents reward correct choices. At the end of each game, each of the accumulated presents drops into an animated "Rube Goldberg" machine. The machine ejects each (with sound effects) as a little graphic image with its accompanying word name. Amazingly, the effect feels emotionally like opening presents.

Despite the poor quality of the printing, the written documentation is good. Program utilities provide for listing performance, controlling prompt timing, including onscreen written instructions, and choosing one of four seasons in the third game.

EARLY GAMES FOR YOUNG CHILDREN

Springboard Software, Inc.
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	B	B	*Value for Money*

A positive feature of *Early Games* is its appropriateness for the 2 to 6 year old child. The menu consists of a series of pictures that make it easy to select the lessons. The program includes nine educational games which require no adult assistance. The young child learns how to match numbers, add, subtract, match letters, alphabetically order, compare shapes, and write his/her name. An additional feature is the "Draw Mode" which allows for saving a drawing, writing a title for the picture, and retrieving the picture from the disk.

These concepts are applicable to the lessons taught in pre-school, kindergarten, and first grade. It is unfortunate that the author did not take advantage of the Apple's capabilities to include more colorful and creative graphics, especially since the program itself is in color. The graphics are too small. The section in which the child practices writing his/her name is boring and dull. Small children enjoy rewards for their efforts (we all do); however, the reward system included in this package is practically an understatement. While the child only needs to press the number keys, Escape, and a few others, parents may need to help younger ones learn to use the keyboard. Parents will nonetheless find this package valuable and worth $34.95 to help prepare a child for school.

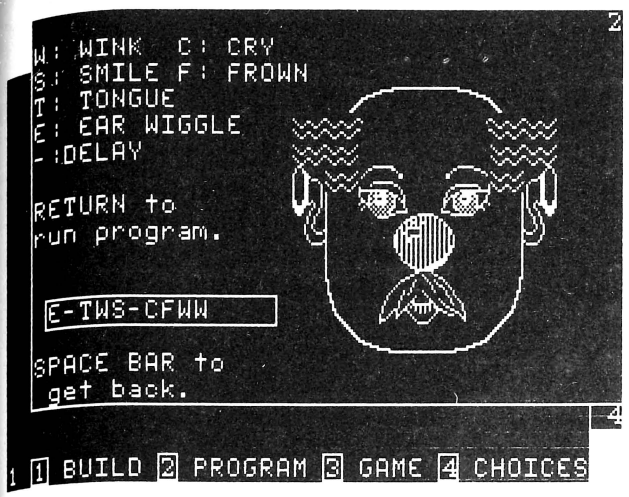
FACEMAKER

Spinnaker Software
$29.95
48K; II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C+	C	*Value for Money*

Facemaker is an educational program designed to introduce young children (4-8 years) to the computer keyboard and the concept of programming. It does this by asking the child to construct a human face from parts: mouth, nose, eye, ear, and hair. Each of the eight choices to the left of the face range from normal to comical. The child sequences through the parts of the space bar and makes his choice with the Return key. For instance, if a child doesn't like the result of adding a particular nose, he can choose another. Each of the parts in the catalog appears on the face as illustrated, except the hair, which is too fine.

Once the child has constructed a face, he can have the face smile or frown, blink, wiggle its ears, or stick out its tongue. A small program can be written using simple letter symbols that cause the face to perform the facial expressions in the order desired. Thus, the letters "W,T-S,E,F" will have the face wink first, then stick out its tongue and pause for a moment, then smile, wiggle its ears, and, finally, frown. It may be a primitive approach to teaching programming, but it certainly is a creative introduction.



There is a final program suitable for developing memory skills. The face, for example, will smile. The child will press the "S" key to indicate that the face smiled. The face will then smile and wink, and the child presses the "S,W" keys. Each time the face makes a longer series of facial expressions. The program rewards the child with pleasant sounds for doing well, and bad sounds for doing poorly.

Facemaker is thus an excellent program for teaching computer keyboard and memory skills to very young children. It offers a cute and clever approach. The graphics are also very well-done.

FANTASY LAND

Learning Well
$49.95
48K; II/II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

This thoroughly delightful treasure hunt game motivates learning. Each of the one to six players captains a ship which moves about a map display of hypothetical islands in search of wizards. Finding a wizard gives you the opportunity to correctly answer a question and earn a magic coin. With three coins in your possession you can search for and win the Sword of Justice by correctly answering yet another question. You meet obstacles along the way, of course: the wind may die, becalming your ship; some islands have no wizards; other players may challenge you for coins (and vice versa), and so forth.

Considering the limited memory (48K), I have seldom seen a more innovative use of animation in conjunction with a teaching program. The simple four-key control is easy to use, and the easily learned instructions on the disk mean that you need never pick up the manual. The questions go beyond simple comprehension, stimulating a capacity for logical analysis by forcing you to make inferences in answering the questions—a powerful approach to helping children become critical, autonomous thinkers. In a culture bombarded by information and constant, competing emotional appeals for attention, the ability to assess the import of any message is vital.

The documentation particularly addresses teachers who want to use the program in the classroom. A utility routine keeps a roster of scores for an entire class. A provision allows you to control animation parameters. In addition, suggestions for additional exercises in analysis and comprehension let you flesh out the program to increase the benefits.

HOW TO PRINT LETTERS AND NUMERALS

Floppy Enterprises
$34.95
48K; II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C-	C-	*Value for Money*

How to Print Letters and Numerals primarily demonstrates basic writing techniques. It does not offer small children nearly as much interaction as do other programs in the Floppy series of early learning programs. No colorful, animated figures to amuse the child and encourage participation. Instead, the screen duplicates a piece of lined writing paper. The child presses keys 1 through 9 or any letter of the alphabet. This results in the letter or number appearing on the screen stroke-by-stroke as a model for the child to watch. Dotted lines indicate the correct position of each figure as it should appear on a piece of wide-lined paper. Pressing the space bar advances the program from figure to figure, while pressing any key calls up a specific demonstration.

In addition to numerous submenu items for both capital and small letters, a stroke option demonstrates proper techniques for forming individual parts of letters or numerals. The submenus offer practice choices

such as capital letters with slanted lines, small letters with circles, and so on.

The Floppy documentation advises that computer-assisted instructions provide but one educational method involving human interaction and that the program should be used with other approaches. With that caveat in mind, teachers may find *How to Print Letters and Numerals* helpful. However, this relatively passive program is not comprehensive and works best simply as an adjunct to the time-honored method of direct pupil-teacher interaction.

JUGGLES'S RAINBOW

Learning Company
$29.95
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

Juggles's Rainbow is one of several colorful (unless you are using a monochromatic screen) children's education programs from the Learning Company. This program, advertised for children age three to six, is designed around the concepts of *above, below, right,* and *left.*

Juggles the clown helps the young learner work his way through three separate programs selected from a picture menu. Each of the three programs follows the same basic format. The user starts off making simple moves using the directions *above, below, right,* and *left.* Each program ends with the creation of a colorful figure displayed as a result of the use of these four commands.

The first of these three programs is "Juggles's Rainbow." It stresses the concepts of *above* and *below.* To aid the child a blue strip of paper is placed horizontally across the center of the keyboard. This corresponds to the blue line across the center of the screen. When the child pushes a key above the blue strip, a line appears on the screen above the blue line. The experimenting child has a chance to make a few random selections to see where the lines appear.

The next portion of the program instructs the child to push a key either above or below the blue strip. If the child misses twice he is sent back to the beginning for more practice. The child is rewarded for knowing the difference between above and below in the final section of the program.

By selecting keys either above or below the blue bar the learner creates a rainbow with color coordinated raindrops. One final step of the program is to get the raindrops to match up to the colors of the rainbow that are directly above them. Again, this is accomplished by pressing either above or below the blue strip.

The second program is called Juggle's Butterfly. It works the same way as the first program except this time the learner is working with *right* and *left.* Now the blue strip is placed vertically up the center of the keyboard so that it matches the blue line on the screen. This program ends with the creation of a colorful butterfly.

The third program combines *above* and *below* with *right* and *left.* This one is called Juggle's Windmill, and when the user is able to distinguish between these combinations of directions the end result is a multi-colored windmill.

Juggles's Rainbow is a program that lets very young learners utilize the computer. It provides a colorful review of the ideas of *above, below, right,* and *left.* However, because it is limited to just these four ideas which it repeats in one format over and over, young users do not want to play with it repeatedly. The three year old who helped me to review this package found that twice through these programs, getting basically the same results each time, was enough.

In a classroom setting, where each learner has access to the program only a couple of times, the program would get sufficient use. However, if it is being purchased for the home where one or two children would be expected to use it repeatedly, I think its usefulness might be short-lived.

LEARNING WITH FUZZYWOMP

Sierra On-Line Systems
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	A	*Value for Money*

Children from three to six can play *Learning With Fuzzywomp* almost unattended. It requires no reading and you control the action with the joystick.

The program consists of four games. Juggling Clown teaches counting. You must release the same number of gumballs as the numeral displayed by the clown. If you pick the right answer, the clown juggles the balls. Bubble Up helps you learn the sequence of numbers from

one to ten. Numbered bubbles float up. You choose the right one by blowing on it with the "hairdryer" (used instead of the familiar gun of arcade games). Domino Match requires you to match the domino displayed by an animated computer. Make-a-Monster is pure fun while it teaches hand-eye coordination. You assemble a cute creature, choosing from a variety of parts. When you have completed the monster, you can play a little arcade-style game using the "hairdryer."

The graphics are superb and the sound wonderful. (You can turn the sound off if it gets too wonderful.) The initial display may take a bit too long—I noticed the little ones becoming restless when watching it for the third or fourth time. Also, it seems that you cannot leave a game in the middle except by hitting the Control-Reset and starting over. The games run a little long for the attention span of three-year-olds.

The documentation consists of an adequate two-page booklet. The program shows you how to play. Older children need little parental supervision. A word of warning when letting really little ones play: my two-and-a-half-year-old loved it, but she apparently took the disk out while the "in-use" light was on. True to the ninety-day warranty, Sierra On-Line sent me a new disk. That's what I call customer support. The disk is copy-protected.

Learning With Fuzzywomp is educational, delightful, and very reasonably priced. Good value for the money.

MICRO MOTHER GOOSE

Software Productions, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	B	*Value for Money*

Micro Mother Goose can be a family affair; parents and children can participate in singing along with the nursery rhymes presented. It also allows the child the independence of using the computer by himself. This colorful program is designed for 3-9 year olds, and presents nine popular Mother Goose rhymes displayed on the monitor along with graphics and music. Three games require focused attention and good timing. "Lamb Scram" requires the child to get all of Mary's lambs safely through the hedge and back to Mary. "London Bridge-out" contains six skill levels and a reward system of points—the object is to knock out London Bridge. The game "Splat" requires the user to catch eggs tumbling off a wall before they crash and splatter. The games require paddles or a joystick.

This program's best features are the picture symbols used in the menu, colorful graphics, audio-visual interaction, and the documentation which includes excellent directions and suggestions as well as a free poster and color stickers. On the other hand, the words displayed on the monitor should be larger for the small child, and $39.95 is expensive for this program. However, the games provide a good challenge for children of the designated age group.

MIX AND MATCH

Apple Computer, Inc.
$50.00
48K; II

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

The Muppets have taken over. Children's Television Network (Sesame Street) has gotten together with Apple Computer, Inc. to make a disk and manual that provide many hours of fun for the entire family. The disk entertains and teaches with a pleasant mixture of programs. Allow me to describe this program further.

Mix and Match does not require an experienced programmer or a computer whiz to run it. The manual goes as far as showing pictures of each step in running the program and explains exactly what to do if you encounter any problems on starting up. After you reach the menu, you see your choices of action on the screen in bold and bright print:

1. Mix and Match—a match-the-Muppets fun game. Add the head of Oscar, the body of Ernie, and the feet of Grover and what do you have? Why Oscar-ernver, of course.
2. Animal—the original Apple game found on the system master disk but with large, bold print instead. Let the computer guess the animal you're thinking of.
3. Raise the Flag—a thoroughly enjoyable "guess the word" game, with the letters rising to the top of a flagpole when guessed correctly.
4. Layer Cake—cake pan too small? With only three pans you may have more trouble than you expected getting that cake to the right pan, especially with up to six layers.
5. Word Editor—the perfect way to add words (up

to six letters) to make your own Raise the Flag game.

The producers have made everything as fail-safe as possible. The people at Children's Television Workshop recommend a color television or monitor for best viewing of this disk, due in part to the use of many bright colors. To top it all off, they have also included non-computer games to keep children active and involved.

The program includes the standard Apple note disclaiming responsibility. On the other hand, they also give you a second disk as a backup, providing for those "oops" that always seem to happen when the little ones are hard at work. Just one thing—have you ever thought of buying a second computer? With this package, you may never get near yours again.

MOPTOWN HOTEL

The Learning Company
$39.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A-	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	B	*Value for Money*

Leslie Grimm, author of *Moptown Parade*, created *Moptown Hotel*. Both feature the same cast of sixteen moppet characters, but the games presented in *Moptown Hotel* are considerably more advanced, intended for children eight to thirteen years old.

The menu lists its seven games in order of difficulty. The first, Who's Next Door?, tests your ability to recognize analogies. Three moppets appear on the screen and you must design a fourth to correctly complete the analogy. For example, suppose that moppet #1 is a tall, thin, red Bibbit; #2 is a tall, thin, blue Bibbit; and #3 is a tall, fat, red Gribbit. Moppet #4 must then be a tall, fat, blue Gribbit. Get the idea? In the next game, Change Me, you must convert moppet #1 into #4 by altering one trait at a time in each of two intermediate moppets. Another version of the same game requires you to alter two traits at a time. Spot Me shows four moppets in a row. You must identify the one most different from the others. (I thought this a comparatively simple game that belongs first on the menu.) Whose Birthday? shows all sixteen moppets. You must discover who is having a birthday. A clue rewards each wrong guess, allowing you to eliminate moppets by deductive logic until "That's it!" appears. Secret Pal, another strategy game, asks you to guess the four traits of the secret pal. Each guess gets a grade according to the number of correct traits. You have nine chances to deduce the answer. Moptown Map asks you to put each moppet in his proper home, as determined by a set of secret rules that change with every round. It's all very logical once you get the hang of it. The last game, Moptown Hotel, allows two players to compete. Each acts the role of a hotel clerk who must assign moppets to rooms. Of course, some restrictions apply. Moppets in adjacent rooms must differ by one (or two) traits, as must those directly above and below one another. Players alternate turns and win points for each correct placement. The computer acts as referee and scorekeeper.

This package has many praiseworthy features. The disk includes all instructions needed for a game. You need the well-written documentation only as a reference. A bored player can press Escape at any time to return to the menu for a new game. The games develop skills in analogies, sequences, negation, strategy, and formulating hypotheses. Of course, you can teach these skills with more traditional methods, but the computer does it so quickly and easily. You can even introduce group games into the classroom, following the suggestions in the documentation. If fact, I found few problems worth quibbling about. I would suggest redrawing the moppets to make them look more distinctly different. Specifically, their design should also help you remember which is a Gribbit and which is a Bibbit.

A final note: I listed a color monitor as a system requirement because color is one of the four traits for distinguishing moppets. A young user will not have the patience to learn that a certain pattern of tiny dots on a monochromatic screen means red and another pattern, blue. The company says only "color recommended." Moreover, the outside of the package should state this, not just the inside.

THE POND

Sunburst Education
$55.00
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	A	C	*Value for Money*

The Pond trains children to recognize patterns and experiment by formulating and testing hypotheses. Simply put, you must discover a pattern that will safely guide a frog through a maze of lily pads. The patterns divide into three major and two minor categories

according to the length (two, three, or four) of the sequence that defines each one. You can play a game in each category, either for practice or in the game mode, with the level of difficulty increasing with the sequence length of each pattern. To discover the pattern, you typically scout ahead from lily pad to lily pad and test your alternate routes. If you carry out the wrong test, the frog jumps in the water and splash! you're back at the beginning of the maze with the opportunity to try a different path. If you need assistance in locating the correct path, you can call up one of two Help options. The first Help screen shows the correct path in the portion of the maze currently displayed on the game screen, while the second Help screen shows the entire maze and highlights the safe path. Of course, you lose points if you use the Help options or if you make too many moves during your initial exploration of the maze. These losses reduce the thirty-five point total that you begin with on each level. To win, you must complete three mazes on a given level before you run out of points. Any points that you don't use while successfully completing a level are credited toward the next higher level.

From a technical standpoint, this single disk game has excellent Hi-Res graphics, no programming faults, and such a well done menu-driven structure that you really don't need the nicely written and entertaining documentation that accompanies the program (this even goes for young children). One negative feature involves the program's recovery from an incorrect test of your hypothesis: it really doesn't. Once you have chosen to guess the correct path and have entered your test sequence, you cannot change your mind and explore some more before carrying out the test.

The first few times you play, the game is quite enjoyable and challenging, even for an adult, particularly on the higher levels where lots of extra lily pads obscure the safe path. Unfortunately, I found myself tiring of the game all too quickly and suspect that most people won't play it more than a few times. This makes it difficult to justify the relatively high cost despite the game's good educational value.

THE PUPPET

Psychological Psoftware
$30.00
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	C-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	D	*Value for Money*

The Puppet teaches the concept of taking responsibility for yourself. It tells a simple story, of Pookie, who always got others to control his behavior so that he could blame them when things went wrong. Then he discovers that when things went right, all praise went to others, too. Concludes the puppet: "Real freedom is taking responsibility for your own behavior."

The program could not be easier to run. You move at your own rate, using only the space bar. It takes approximately four to six minutes, certainly a brief running time for a $20.00 program. Although advertised for children from eight to eighty, the accompanying literature addresses parents. Actually, it says more than the program itself. The material presented is clear and concise, but relatively superficial. At least the message that you should take charge of your own actions comes across clearly.

Easy to read text accompanies the minimal graphics. More graphics would improve the visual appeal and enliven the program; as marketed, the lackluster puppet changes position only slightly throughout. This simple program may suit children, but offers little for the money. It could provide a short break for therapy sessions, or relief at home when parents need a little time out. You can get a backup disk for this copy protected program from Psychological Psoftware for $5.00.

SAME AND DIFFERENT

Floppy Enterprises
$29.95
48K; II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C-	C+	*Value for Money*

Same and Different, designed for very young children, offers a mildly engaging game atmosphere aimed at developing perceptual skills and, tangentially, other basic abilities such as reading. The child uses only two

keys to distinguish gross and fine differences between objects. The principal character is Floppy, a smiling, animated creature who looks a little like a *Pac-Man* ghost with wiggling antennae. Floppy helps with menu selections and indicates right or wrong answers with nods and beeps.

The program presents colorful, Hi-Res objects on the upper part of the screen; on the lower part Floppy dances between a box containing two squares, indicating their sameness, and a box with a square and a circle, indicating their difference. The instructions recommend placing special markers on the "W" and "O" selection keys, but you probably need not do so. The nonverbal cartoon menu offers four program options. The first allows twenty-five reponses which are either the same or grossly different, such as two flags or a flag and a snowman. The menu progresses to objects which look basically the same but have a subtle difference, such as two snowmen, one without a hat. The final section of the first menu option presents capital letters which are the same or different. The second, third, and fourth options offer shorter games based on the three main ideas above. A fifth option offers instructions.

Youngsters might find these drills amusing and teachers will enjoy them as refreshing visual aids. *Same and Different* also offers a gradual introduction to computer use, but it really is not an outstanding educational tool.

THE SCAREDY-CAT

Psychological Psoftware
$39.50
48K; II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B+	C-	*Value for Money*

The Scaredy-Cat helps younger children deal with fear. It teaches them to understand their feelings and their fear of the unknown by telling an easily understood story about a fictional cat who learns about himself and his fear. Large, bold, Hi-Res text joins pictures and moving displays to keep children interested in the action. Pressing the space bar moves you to the next screen. The entire program takes about fifteen minutes.

A child in the second grade could probably read the text displayed with little prompting, but unfortunately the story produces more effect on preschool and kindergarten children. *The Scaredy-Cat* ideally suits either setting and you could thus use it for each new class. The manual will probably do more good than the program itself, because it takes you through the ideas behind making a child understand fear and tells you as an adult how to act as well. It presents some examples that you can relate to, examples of possible problem areas, and tells you how to lead younger children through difficult areas with the fewest problems.

A simple plan backs the disk; if it doesn't work, send it back and Psychological Psoftware will replace it. You can obtain a backup for $5 and the registration card.

SHAPE & COLOR RODEO

DLM
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Neosoft, Inc. developed this disk for the Early Childhood Software series distributed by Development Learning Materials (DLM). This package has six programs that teach shapes and colors. Parent and child should play as a team. The colors are excellent and the animation and music follow a rodeo motif. Everything is in Hi-Res graphics, including the text. You need a color monitor (or television) because much of the action involves color differences that won't show up on a black and white screen. The disk is copy-protected, but the company will replace defective disks at no charge within the first six months. Replacements after that time and backup copies cost a rather high $25. The attractive package includes a well written and easily followed User's Guide, plus instructions on disk. You can turn off the instructions or sound if you wish. The six sections are:

- Rope Trick introduces basic shapes: square, rectangle, circle, oval, triangle, and star. Your choices create a sequence of shapes formed by a cowboy with his lasso.
- Shape Roundup asks you to find the various shapes in a rodeo picture. Variety and subtlety of shapes keeps this game from being too easy.
- Rodeo Flags asks you to pick out the flag that doesn't belong in the sequence of four flags on the screen.
- Cowhand Brand pits you in a quirky race against the clock that exercises eye-hand coordination. You direct a cowboy to lasso the steer that matches a

selected shape.

- Color Mix and Match 1 and 2 pit you against the computer in the first part and against another player in the second part. You try to match up three squares of the same color before your opponent does. You select colors with a white dot that moves around the colored squares rather like the ball in a roulette wheel. The colors contain the three primary colors (red, yellow, and blue) and the three secondary colors (purple, green, and orange). Players have the opportunity to mix the primary colors to form matching squares of secondary colors. This section provides an excellent demonstration of the principles of color mixing.

This well done package will most certainly teach the basic shapes and colors in a competent fashion.

SPELLING AND READING PRIMER

Peachtree Software
$39.95
48K; II/II+/IIe

Overall Rating	C	C	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	C-	C	*Value for Money*

Spelling and Reading Primer aims to teach preschool children reading and spellings skills. There are three programs in this package: Reading Primer, Spelling Bee Drill, and Spelling Bee Tutorial. All three programs use pictures and words in matching combinations.

Reading Primer shows the child three drawings on the left side of the screen and one word on the right side. Using the space bar, the child places the check mark on the picture that matches the word. If he is correct, a drawing of a face smiles and a little melody plays. If he answers incorrectly, the face frowns. In Spelling Bee Drill, a drawing is shown and the child has to spell the matching word. In the Spelling Bee Tutorial the child is given a chance to see the word for a pre-set period of time, and then must spell it.

The package chooses words from twenty-two "word pools." The parent, teacher, or supervising adult can select the exercise, the word pool, and the level of difficulty using the Learning Manager. This portion of the program also lets the teacher/parent see how the child scored on the last group of words.

The program works well and I encountered no serious bugs, although some things slow down the operation of the program unnecessarily. It is annoying to have to go through the initial logo each time the program loads. Whenever you move your child from one level to the next, or even from one exercise to another, you have to reenter his/her name and the scoring information disappears. The Learning Manager also takes far too long to load.

The graphics are poor, consisting of simple outline drawings, some of which are difficult to recognize even on a monitor. The sound, unfortunately, is unimaginative. The manual is seventeen-pages long and contains an index, but is written in a turgid, stilted prose that manages to sound impressive without conveying much meaningful information.

There is no way (within the program) to keep continuous track of the student's progress. In addition, you can only use it for one child at a time. (Most programs of this type have space for at least a classroom full of students.) This disk is copy-protected, so if your kid ruins it, you'll have to shell out five dollars to replace it.

Although the program is of some educational value, the commonplace graphics and sound, the limited capacity for classroom use, and the relatively high price make for a mediocre product. In other words—it's not worth buying in light of the competition.

STICKYBEAR SHAPES

Xerox Educational Publications
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	B	*Value for Money*

Stickybear Shapes helps children from three to six identify five common geometric shapes: circle, square, triangle, rectangle, and diamond. It consists of three games. In "Pick-It," children identify the missing shape in each picture. In "Name-It," children match shapes with the correct name. In "Find-It," children match a sample shape with one hidden in each picture.

Each picture in "Pick-It" contains a missing shape. Five sample shapes appear at the bottom of the screen. The child presses the Arrow keys (or turns the dial if using the paddle mode) until the appropriate shape begins flashing. Then he or she presses the space bar (or pushes the button). If the child answers correctly, the missing shape appears, accompanied by music and animation. The wrong answer calls forth a low, bloop-

ing sound. After finding the correct shape, the child presses the space bar for a new picture. I found this the most difficult game of the three. On a black and white or green monitor, I often had trouble seeing which shape was missing, but on a color monitor I had trouble picking out the shape to identify. In color, a gray outline or shape would have made identification easier.

"Name-It" presents the name of a shape. Five sample shapes appear at the bottom of the screen. You press the Arrow keys (or turn the dial) until the appropriate shape flashes, then press the space bar (or button). A correct answer calls up music and animation; a wrong answer, a low, blooping sound.

"Find-It" displays pictures containing all five shapes. A shape and its name appear at the bottom of the screen. You press the Arrow keys until the right shape flashes, then press the space bar. Correct answers cause the picture to become animated, while wrong answers result in the blooping sound. You press the space bar for a new picture after finding the correct shape.

The Hi-Res graphics, animation, and sound effects are excellent, fascinating young children. The documentation and additional teaching aids (books, poster, stickers) offer many opportunities for reinforcement. I also liked the feature that allows young children to use only the space bar and two Arrow keys, which saves time and prevents frustration.

STICKYBEAR OPPOSITES

Xerox Education Publications
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	C	*Value for Money*

Stickybear Opposites familiarizes children from three to six with the concept of opposites. Press one Arrow key, and a picture of Stickybear with a happy face might appear along with the word "happy." Press the other Arrow and the picture changes to a sad face along with the word "sad." Press the space bar to produce a new set of opposites. Young children can explore the keyboard without crashing the program. The space bar calls up new opposites; the left and right Arrows, numbers one and two, or letters O and P produce companion opposites. Young children can run the program using only three keys, while older children can learn to use the number and letter keys. The program also supports a paddle.

A colorful *Stickybear Opposites* poster reinforces the concept, displaying some of the pictures used in the program. A delightful hardback book, *Yes and No*, contains many additional sets of opposites. In the program itself, the high-resolution graphics, animation, and sounds are excellent. The display fascinates children, and teaches the concept of opposites clearly and easily. Just don't lose the documentation—the disk contains no directions.

WEBSTER'S NUMBERS

Peachtree Software
$39.95
48K; II/II+/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B+	*Value for Money*

Building upon the success of his program *Introduction to Counting* (originally called *Counting Bee*), John Conrad has fashioned a series of four programs in which early elementary students can more actively play with sequential numbers and shape arrangements. Given the similarity of some of the games to adult pastimes, I suspect older children and adults may very well find some of these amusements engrossing.

Ribbet, the first program, is a clever *Frogger* clone. In this one, though, the frogs are rather slow-witted opponents, patrolling a maze in search of a mosquito that you maneuver from one numbered square to the safety of the next higher numbered square (up to nine). Points are awarded for each square reached; if you reach 900 points, you get an extra mosquito as a reward.

The frogs leap a space at a time and eat the mosquito only if it gets right in front of them. If you try to enter a numbered square out of sequence, the correct square blinks. Succeeding screens present more difficult mazes and, sometimes, an increased number of frogs. I got as high as six—causing them to have traffic jams. You can increase the fun by taking greater risks: slipping in back, along the sides, and even in front of the plodding frogs.

The second program, Balloon Race, changes the pace, though it continues to emphasize counting and eye-hand coordination. This is a game for one or two players. You can use the buttons on a joystick or paddles to float a balloon to a number at the top of the screen corresponding to the number of blocks below.

Up to four clouds drift in the space between the ground and the numbers at the top. If the balloon hits a cloud or the wrong number, an electronic "squawk" reprimands you, and visual turbulence forces down the balloon. In addition, if you steer to the wrong number, the squares below the balloon will number themselves and wait until you head to the right number. Our author, Mr. Conrad, has put in a realistic touch by making it necessary to lower the balloon in some cases, in order to work it around clouds or to reach a distant number.

Shape Up tests the child's shape and spatial recognition abilities, and his problem-solving skills as well. Using a joystick or paddle, you must shoot up to ten different shapes into an arrangement within a rectangle which matches a display in the top half of the screen. Typically, you start with three shapes and if you succeed, you move to increasingly higher levels requiring greater accuracy. You (the parent/teacher) may arrange to start or end the program at various levels (different number of shapes, ranging from three to ten), and can control the number of trials (one to ninety-nine).

Somewhat like the aforementioned game, Pushover requires moving shapes within a box by a joystick-controlled shooter that moves along the walls of the box. In this case, the player or players take nine numbered squares and put them in order along a horizontal line. The limited space available in the two boxes necessitates some planning and maneuvering of the squares. Pushover is quite reminiscent of those plastic dime store games where you slide small red and white squares around a frame to line up a consecutive sequence of numbers. (Quite frankly, they drove me up the wall a bit during my grammar school days.)

Both Shape Up and Pushover require that whatever joystick or paddle(s) you use have a full range of movement on both axes. Conveniently, Conrad supplied a paddle/joystick check in the utility or Configuration program that you may invoke via the right arrow key. You can also sharpen the image for a black-and-white monitor (it makes no difference on a green screen), and silence the sound effects.

Webster's Numbers combines thoughtful design and originality. All the programs are a lot of fun—in fact, they're almost too much fun to be strictly labeled "educational."

Peachtree will replace a defective disk free for the first ninety days, and for a twenty-five dollar fee thereafter. The documentation for this software is clear and very complete. It also lists a customer assistance number for help, if you should need it, and the vendor offers a discount on any updated version of the package. A sweet deal.

THE YOUNG FOLKS SERIES

Island Software
$25.00 (each); $100.00 (series)
48K; Apple II/II+/IIe; light pen optional

Overall Rating	B-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	C	*Value for Money*

The Young Folks Series consists of four educational disks for very young children. Most lessons deal directly with observational skills—telling which character differs from or resembles another—while others teach positioning (over, behind, beside, and so on).

Puss in Boot teaches positioning, using words such as off, behind, next to, in front of, and so on. A picture appears on the screen and two sentences describe the position of Puss (the cat) in relation to the boot. The child reads or is read both sentences and selects his or her choice by pressing the 1 or the 2 key, or by using a light pen. Teacher or parent, can view the summary of answers at any time by pressing the S key. This helps you determine how many problems the child answered correctly and what sections have given him trouble.

Chugga, chugga, rattle, rattle—a word comes up for approval in the word game/learning program *Word Factory*. The odds on getting the right answer are about fifty-fifty. The child presses either the < key or the > key to slide the word into the correct hopper. One bin holds the misfits and incorrectly spelled words; the other holds correctly spelled words. As each word slides into one slot or the other, you can observe which words landed correctly. After five good words fill either the good or the bad side, the game ends. The program mixes up words of three to six letters and reverses them for display. You can also add words that may have caused problems for the child, or words needing special attention. With over 120 words stored, there are enough variations to keep interest up.

Milk Bottles teaches the concept of quantity. The screen displays milk bottles and asks questions on such things as which bottle contains the most milk, which bottle is empty or just partially-filled, and which bottle differs from the others. The child has four choices, selected by pressing 1-4 or using a light pen to touch the selection. A picture of a milk cow rewards each correct answer. Pressing the Q key at any time displays a summary of the answers and their accuracy.

Letter Games displays both upper- and lowercase letters in three game formats. In the first game, the child chooses which word in a crosshatch pattern looks different from the others. The program usually displays nearly matching letters, such as Q and O, t and f,

p and d. Again, the child can use a light pen or type the keys 1-4 to choose the answer. In the second game the letters appear in a single line, rather like this:

p / d p d d

The last game uses the same format but different letters on the right side, more like this:

O / c O Q D

As with the other games, pressing a single key (in this case S) lets you view the summary of correct and incorrect answers.

With each program developed to do a specific thing, do not expect them to fill all your training needs. All of the games were devised to keep younger children interested and attentive. Each has its own method for rewarding children for correct answers, although the simple rewards do get slightly monotonous. You will have no trouble understanding the simple instruction sheets that come with each disk. However, having been printed on a dot matrix printer with no descenders and, at times, a poorly inked ribbon, the print is very light in spots.

Thinking Skills

PERCEPTION GAMES

Peachtree Software
$29.95
48K; II/II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	A	*Value for Money*

Grades: Varies

This set of seven activities tests visual perception. These computer amusements are educational because they teach you about yourself. I don't think *Perception Games* teaches you new skills as much as it tests your present ones. To some extent, though, the activities may improve perception by teaching you to concentrate better.

These games can be played by almost anyone since you adjust the skill levels. Very young children could get a little frustrated, though, and will need help working through the menus and making the right choices. The program has a very thorough score-keeping system, but does not "reward" the player with sounds or pictures, as most programs geared to children do. Adults will enjoy the games, too, and they can play against the kids without any advantage. In fact, a good thirteen-year-old arcade player will invariably beat an adult every time.

The Visual Discrimination game lets you compare the lengths of differently placed lines. Shape Memory shows a shape through a moving window, then requires you to match it to one of four figures. In Star Trace, you guide a point of light through the space between one star shape and another drawn inside the first. By adjusting the width of the track and determining the number of times you are allowed to hit the walls, you could turn this into a very challenging game. Now I know how Luke Skywalker felt!

This game was the only exercise in the package in which I experienced any ease-of-use problems. It requires the paddles to be "set," though the documentation did not clarify exactly what it meant by this term. I was using a joystick and I encountered several moments when the joystick would not move. It was not a major annoyance, however, and was the only mechanical difficulty I ran into.

Centering a Falling Line sends a second vertical line falling next to a stationary one. When you think the centers of both lines are even, press a key; the program then checks your accuracy and assigns you a score. I found this activity the most interesting, but everyone who played the game on my computer voiced a different favorite.

In Visual Pursuit, you use the joystick to maneuver a set of crosshairs into a moving box. You can adjust the size of the box and the number of chances you have.

Tilt Maze is a computerized version of a popular maze game commonly sold in retail stores. It consists of a box containing a series of passages. By "tilting" the box, you try to guide a ball without letting it fall through holes in the box. This action has been cleverly recreated on the computer. (I found it just as frustrating as the original version!)

The manual is a mediocre, but adequate eleven-page document. Some of the instructions were a bit obscure, especially the one about setting the paddles for Star Trace.

The disk is copy-protected, and it will cost you five dollars for a replacement. I would like to see Peachtree issue an unprotected disk for this product, or to receive a more generous warranty policy from them (something similar to Sierra On-Line's free one-year replacement offer, for instance).

On the whole, *Perception Games* is an attractive alternative to the hoard of current Apple arcade games. It is reasonably priced, but probably is not exciting enough to lure kids away from *Castle Wolfenstein*. After all, the *Perception Games* package is rather interesting and challenging, and it does teach you something about yourself.

LEARNING WITH LEEPER

Sierra On-Line Systems
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: Preschool-1

It sounds difficult to program for kids who don't read using a computer that doesn't talk, but Sierra On-Line Systems has done so successfully. The disk consists of four programs aimed at children from three to six. Each program suits the proper age range, important because this prevents frustration.

The menu consists of a picture in each corner. The child chooses a program by moving Leeper to the vicinity of a picture using the joystick. For example, choosing the paint can allows a child to paint pictures in four Hi-Res colors using a paint brush that paints in a swath of approximately Lo-Res width. The joystick controls the direction, while the game button controls the ability to paint. Choosing the frog calls up a frog running through a simple maze. The child guides the frog with the joystick. Successful completion with only a few errors results in a ten second cartoon reward and a chance at more difficult mazes. In subsequent mazes, a caterpillar chases the frog. Don't worry—no violence occurs. Neither caterpillar nor frog gets eaten. However, if the child makes too many mistakes on the first maze, the more difficult mazes never appear. Instead, the program offers the Main Menu and another choice.

Choosing the beagle from the menu lets the child match sets of items. In this case, the child matches the number of bones to the number of dogs. The puppies then walk over to their bones. If there aren't enough bones, the puppy left out whines. If the number is just right, the screen fills with happy faces.

The final picture on the menu, the hot air balloon, becomes a skyhook for picking up one of four shapes in order to match a given shape. Correct answers get lots of rewards, including bursting balloons and even a short, ten point balloon popping game. The program moves on to two additional levels of difficulty if it detects prior success.

The documentation adequately tells a parent how the program works, but it really requires little more because it is, after all, designed for the child to run. It does need to say more about the educational aspects, but this is a minor drawback. This outstanding program combines fun, stretching the child's ability, and reward. It minimizes failure and contains no violence. The kids on the block, always the best jury, attest to the excellence of this program. When a three year old friend came to visit my six year old daughter, my daughter, already adept at the entire program, booted the disk for her younger friend. She then showed her how to use the joystick and for the next thirty minutes the two girls alternated between intense concentration and squeals of laughter. With programming like this, an Apple is an extremely powerful educational tool—even in the hands of a six year old educator.

MASTER MATCH-BASIC SKILLS

Advanced Ideas, Inc.
$19.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	C	*Value for Money*

Grades: Preschool-2

Master Match-Basic Skills is a subject disk module for the *Master Match* system. You must own the original *Master Match* in order to run this package.

The object of the program is to expose four to seven-year olds to basic skills that will be useful in everyday life or in school (telling time). Although there is little interaction involved in just picking numbers, the strength of the program is that it will help children build memory skills through trying to remember the location of previous answers that did not match. This early exposure may help the child recognize these concepts when they are presented later, or reinforce those already known.

The program is in a quiz show, educational game format. You are presented with twelve numbered boxes and are asked to pick two that match. There are twenty-seven different subject areas in the catalog which include matching math problems and answers, letters of the alphabet, designs, animal sounds, hands of the clock with actual time, and so forth. By using the authoring system of the master disk, you may also create your own subject areas or change some of the old ones.

Most children in the target age group will not have very advanced reading skills; some will have none. This is the primary weakness of the program. Some of the subject concepts, such as subtracting from a number line, will not be encountered in most school systems until the later elementary years. Hopefully, as in listening to a foreign language, exposure may build path-

ways in the brain which will "light up" later on.

The instructions on the disk are simple enough. The repetition of just picking numbers may become tiresome after awhile and the child may prefer a more interactive educational program.

TINK! TONK! SERIES
Tuk Goes to Town
Tink's Adventure
Tonk in the Land of Buddy-Bots

Mindscape, Inc.
$34.95 (each)
64K; II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Grades: Preschool-3

The *Tink! Tonk!* series was developed by Mercer Mayer of children's literature fame. These programs take a gentle approach to interacting with children and are a relief from the shoot-'em-up arcade style educational software (although there is one arcade game here). The format is generally well thought out, and the story line or scenario under which the various shape-recognition, alphabet, and spelling games are played capture childrens' attention. But don't look for the whimsical, idiosyncratic illustration style of Mercer Mayer here. The *Tink! Tonk!* characters are strictly hard-edged, low resolution, block creatures which I find hard to like.

In *Tuk Goes to Town*, Tuk decides to do exactly that. The child helps him decide how to travel, e.g., in a car, train, or one of six other choices. Next, Tuk chooses two of four routes into town: farm, fair, forest, or seashore. On the way, the child can stop to admire the scenery, speed along, or play a game. Once Tuk gets into town, he needs help to cross a street, after which there are three stores to visit.

The games themselves are shape recognition and/or spelling games. A typical spelling game is Farm where the child has to unscramble animal names in order to pen up the corresponding animal. Toy Store asks the child to pick out the package that is different by pressing the letter key associated with it. The letters then build up a "toy-store" word. There are two difficulty levels for this game.

In *Tink's Adventure*, Tink can either fly by helicopter or boat along in his adventure through the mysterious islands on a lake. The seven games, which can be played by themselves or in the context of exploring the terrain, give the child practice in learning the alphabet and the computer keyboard. For example, in Get Gas, the child chooses either to fill in the last or the first letter in a five-letter, alphabetical series and, as he types in each correct answer, the needle on the helicopter's gas gauge creeps toward full. Go Fishing, on the other hand, helps the child to become familiar with the keyboard. The game divides the keyboard into four sections and each section can be practiced separately, or all the letters and numbers can be practiced at once. The child hooks the fish that travel across the screen by typing in the correct letter to match a letter sequence that travels with them.

The games where either keyboard or ABC order is practiced are both fun and playable. However, when the two types are combined together, as in one option of Gork's Treasure, the results can be very confusing. While the skill of distinguishing an alphabetical order from a keyboard order is of doubtful value.

In *Tonk in the Land of Buddy-Bots*, Tonk receives an emergency call to go to Buddy-Bot land where a Buddy-Bot's parts are scattered everywhere. Tonk moves about the land with the help of a map and either a joystick or the keyboard. Tonk can collect the parts either by finding them at random around Buddy-Bot land or by entering a dark cave and playing a game. The adventure includes such obstacles as Gork's Soldiers, Black Holes, and Sky Holes.

There are six games, each with four levels of difficulty. These games help the child with shape and pattern recognition, concentration, and memory. For example, in Match the Shadow, the child tries to match the Minibot on the left-hand side of the screen with one of six shadows on the right. In Minibot shuffle, a Minibot is shuffled among three boxes and the child has to follow the quick shuffles to find the box with the Minibot. The shuffling is sufficiently swift and deft enough to do justice to a carnival hustler.

Mindscape produces these programs for children aged four to eight. However, initial guidance by an adult is recommended, especially if your child is not yet a reader.

Each program has its own nifty theme song. The disk, instructions, and a glossy catalog come in a red, sturdy plastic, book-shaped case with the main character, Tink, Tuk, or Tonk, on the front cover. At least the consumer is not misled as to the type of graphics used in the programs. The package is rugged and well designed, and can easily fit on a book shelf along with other children's books (maybe alongside your Mercer Mayer collection).

RACE THE CLOCK

Mind Play
$39.95
48K; IIe

Overall Rating	B+	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B+	A-	*Value for Money*

Grades: K-7

Race the Clock is an adaptation of the TV show "Concentration." The usual grid of boxes is displayed on the screen behind which are hidden either pictures, words, or a combination of the two. You uncover successive pairs of boxes looking for a match. Since the game is played as a "race against the clock," in order to win, you must find all the matching pairs before time expires.

The aim is to develop the word and picture association skills of children between the ages of five and twelve, with special emphasis on verbs. The younger children start out with the picture/picture matching option. Each of the pictures corresponds to a verb contained in a series of word lists stored on the disk. *Race the Clock* cleverly uses animation to carry out the action portrayed by that verb. The graphics are visually attractive and very well executed. In the picture/word option, children match the animated pictures with the actual word. Finally, the word/word option strengthens word recognition skills for older children.

For each of the above options, you select the size of the grid from three choices, and set the time limit. You can also create and store sixteen of your own matching word sets which can then be used in a word/word matching game. This would allow your child to work with words other than verbs.

The entire program is menu-driven and simple to use. On the negative side, the program must be rebooted each time a game has been completed rather than allowing you to return to the main menu, select a different option, and play again. Only if the child wants to replay the *identical* game (for instance, for purposes of practice) can he avoid having to reboot. Another minor hassle is that for each game played, you must choose your input controller (keyboard, joystick, mouse, etc.). It seems to me that you should only have to make this choice once and then be allowed to save this information on the disk. Correcting both these problems would make the program easier for young children to use without help from an adult.

You should be aware that an earlier version of *Race the Clock* exists that did not permit editing of the word lists (short of deleting them entirely) once they were created. Hopefully, these have all been removed from the shelves of computer software stores. Nevertheless, if you should accidentally receive one of these (as I did), the manufacturer will graciously exchange it free of charge.

The documentation that accompanies the software is short and simple, but sufficient; the program is really self-explanatory. The instruction booklet contains a nice section on parental or teacher guidance for helping the student to get the most from the program.

Race the Clock is a well-conceived and entertaining piece of educational software. The animation really helps children understand what an action verb is. Playing the game may also strengthen memory, and powers of concentration. Although it is not totally original in its concept (there are other, similar programs out there in the marketplace), *Race the Clock* is skillfully crafted and worth buying.

GERTRUDE'S SECRETS

The Learning Company
$44.95
48K; II/II+/IIe/IIc

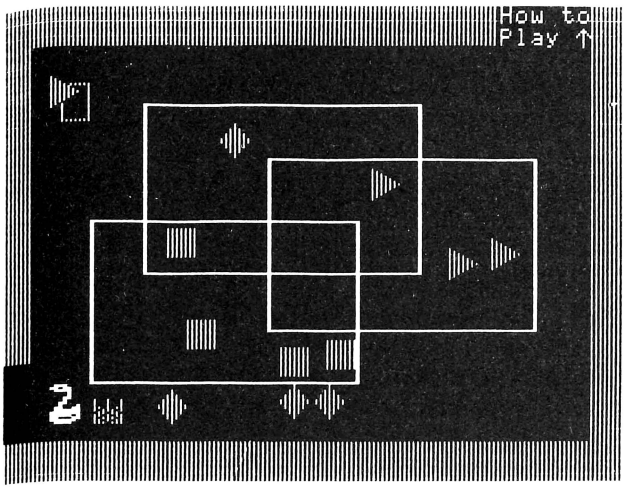
Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	B-	*Value for Money*

Grades 1-5

Gertrude's Secrets is an educational program for young children aged four to nine, that teaches them how to think. It does this by first showing them how to use the computer, and then how to analyze specific situations and develop logical problem solving strategies.

First, the child is introduced to the computer's keyboard commands. The I, J, K, and M keys guide a small box about the screen. Objects like Gertrude, a white goose, can be picked up and moved by pressing the space bar and positioning it with the direction keys. Hitting the space bar drops it. Once the child has grasped this, he has a choice of continuing to use the keys, or he can switch to a joystick. The joystick button then picks up and drops the objects.

Objects with both different shapes and colors are introduced. The various puzzles help the child to learn to identify likeness and similarity on two different levels. That is, objects can be the same in color or shape, or both. In the loop puzzle the child is asked to determine which pieces belong in which box. To do this, an object is placed in a box. If it belongs there it will stay, and if not, it will fall out. Thus the child quickly learns, for example, that only squares belong in one, and in the other only red objects. The overlapping section, or subset,



will contain a red square shape for it belongs in both sets. Although children will approach this puzzle by trial and error, most will soon catch on, showing the preliminary workings of logical deduction.

The other types of puzzles are the array puzzles and the train puzzles. These latter puzzles are boxes connected by one or two lines. Boxes connected by a single line require pieces that differ either in shape or color. Boxes connected by two lines must differ in both shape and color. The 3 by 3 and 4 by 4 array puzzles require the child to match pieces that are all the same shape or color. When a puzzle is correctly solved, the walls flash and the child is awarded a prize.

Each of the puzzles has adequate instructions, and an illustrated game example is provided in the "How to Play" room. There is also a "New Puzzle Piece" room where the child can choose colored shapes that are less geometric, more monster-like, or novelty shaped. The colorful manual that accompanies the program is designed for the child, although he doesn't need to consult the instructions beforehand since all the needed instructions are displayed on the screen.

Overall, *Gertrude's Secrets* is very easy to use and provides a good learning experience for young children. The program is logically organized and has high educational merit.

MOPTOWN PARADE

The Learning Co.
$39.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 1-5

Moptown is a fanciful village whose citizens, called moppets, look a bit out of the ordinary. They come in different shapes, sizes, colors, and varieties. Bibbits, for example, have long noses and turned-up toes. Gribbits, on the other hand, have short noses and curly tails. Given four different attributes, each with two values, the total number of unique moppets is sixteen. Assuming that you are six to ten years old, the fun can now begin.

Moptown Parade begins with a colorful title screen followed by a menu offering seven games listed in order of difficulty. The first, Make My Twin, introduces you to the four attributes and teaches elementary skills needed to communicate with the computer. You direct the computer to construct a moppet identical to the one pictured on the screen. The next game, Who's Different?, asks you to identify the one moppet among four who doesn't match the others. What's the Same? shows four different moppets and requires you to identify the attributes common to all four. Make My Opposite is exactly what it sounds like. Who Comes Next? requires more cleverness. Four moppets stand in a row. You must look closely to discover that their traits establish a pattern, such as ABAB. Now predict what the next moppet in the row will look like. Another challenge, Moptown Parade, shows you only one moppet at first. Succeeding moppets differ by one trait each. You must design them according to this rule. Finally, Clubhouse tests problem solving strategy. You see all sixteen moppets. You nominate one for membership in the club. If he has the trait required for membership, he enters the clubhouse. After a bit of trial and error, you can guess the membership rule.

I have just one suggestion for improving the package, plus one complaint. The Learning Company should add an on-disk narrative, including graphics, to introduce first-time users to the moppet characters. Also, since you must have a color monitor for this program, that fact should appear on the outside of the package, not just the inside.

Moptown Parade is an excellent product. It clearly deserves the favorable recognition and reviews it has received. Its gentle user-friendliness is bound to make a favorable impression on the young child who is just becoming acquainted with computers. I appreciate the

way it addresses a general problem common to the use of computers in education: they tend to isolate the child and thus become boring. The program documentation for *Moptown Parade* suggests ways of using the program with an entire class. The children first construct moppet playing cards to use for group play with computer. What fun for a rainy afternoon!

FACT OR OPINION

Learning Well
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	C	*Value for Money*

Grades: Red Level 2-3.5
Blue Level 3.5-5

Fact or Opinion, one of Learning Well's microcomputer reading games, is designed to give children with reading level 2-5.0 practice in differentiating facts from claims. The use of advertisements, ranging from concocted ones to those with a ring of familiarity (the soap that's 99% pure and floats) is an intriguing and certainly relevant approach for children bombarded by commercials. This is also a skill that gets short shrift in most elementary curricula, and when presented at all is often relegated to rather dry passages in a workbook.

The game format places up to 6 players on a shopping mall "board" with a random die roll dictating the number of spaces for each move. Landing next to a store door gets you an advertisement, or a set of three statements, which you must judge fact or opinion. Landing on two particular squares automatically moves you to a store door; land on two others and you lose a turn. A correct answer gives you one of the five presents you must accumulate before exiting the mall. The first one out, wins. At the end, a score is displayed and/or printed which gives the number and percentage of correct answers.

Some of the slogans are obvious; some are in that rather grey area of "stretched truth." For example, a travel agency ad which proclaims "Just pack your bags, we do all the rest," was called fact. Hmmmm...do they take the dog to the kennel, stop the mail, have someone cut the grass, etc? Oh well, I guess that fact can be a matter of opinion.

There is much to praise in this game. It tackles a skill rarely emphasized in a school curriculum and does it using an interesting and entertaining format. The documentation is excellent; the play is fast; it has nicely done graphics and sound effects. It kept a 7 and an 8 year old occupied for an hour and brought on some interesting discussions of facts and opinions in which, occasionally, the computer was judged nuts.

There is one minor, one medium, and one serious problem with the program. First, there are a few typos, like the failure to capitalize "monday." While this doesn't detract from the substance or play of the game, it just shouldn't be part of any educational program.

Second, whoever exits the mall first wins, althought he may have gotten a much lower percentage of correct answers than his opponent. In essence, luck, in the form of fewer turn losses and more frequent landings at a store door, triumphs over skill. This greatly offended the sense of fairness of all the children recruited to test this game.

Finally, although the manual states that there are over 90 reading selections, any extended play presents questions already encountered. That children quickly recognize the questions and hence the answers diminishes the amount of practice available. At the hefty price of $49.95, there ought to be a way of extending the "life" of the game.

CAUSE & EFFECT

Marsh Film
$39.95
48K; II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	C	*Value for Money*

Grades: 3 and up

This package illustrates the difference between deductive and inductive reasoning—not an easy task for a teacher, let alone a computer. *Cause & Effect* transports you to the planet Inducto, where you encounter a group of one to four creatures that look like circles, squares, and various other geometric shapes. A force in outer space acts on the creatures, making them change. You then induce precisely how the force will act on each creature, avoiding speedy conclusions and premature judgements.

On the planet Deducto you encounter the same creatures. This time, however, you get a general principle about how the force will act. Then the force acts on the creatures a number of times, but only once according to the stated principle. You must deduce the one that correctly reflects the general principle.

I thought the overall format of this program was

good, but found one small flaw. The force that makes things grow sometimes makes the creature grow by only one pixel, which makes it look unaffected. This program should test your powers of reasoning, not your eyesight. The concept, however, is both unique and excellent. *Cause & Effect* does a good job of teaching deductive and inductive reasoning, but does so at a fairly high cost.

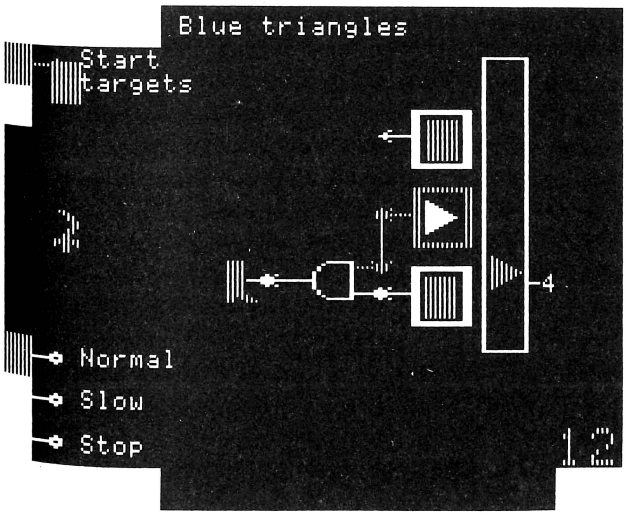
GERTRUDE'S PUZZLES

The Learning Company
$44.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	B-	*Value for Money*

Grades 3-8

Gertrude's Puzzles is an educational package that is similar to *Gertrude's Secrets*, but it is designed for older children aged 6 and up. It too is geared to help children develop reasoning skills and logical deduction. There are six logic puzzles based on set theory. The array room puzzles require that the pieces be arranged so that each piece in any row or column differs in both color and shape. In addition, the 4 by 4 array puzzle must meet this condition on both diagonals. Likewise, the network or train puzzles are much more complicated, and the loop or box puzzles have as many as three boxes with overlapping sections.



A new puzzle begins each time Gertrude brings in the pieces. Sometimes the loop puzzles use only different shapes or colors in the non-overlapping sections, but other times, finding the proper sub-set in the overlapping section is required. Since pieces that don't belong fall out, the child will eventually be lead by trial and error to find the correct solution.

Again, this is a very good educational package that allows the child to think. It is easy to use, colorful, and challenging. The *Gertrude* series offers an excellent purchase for parents who want to see their children learn something rather than just play games.

THE FACTORY

Sunburst Education
$55.00
48K; II+/IIe/IIc/Franklin

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 4-7

This delightful educational game from Sunburst, a company that's been in the education field for over twelve years, targets ages seven to adult. In it you learn to set up factories that produce specific products, but first you must learn how to use the machinery. There are three types of machines: the Punch Machine, Rotate Machine, and Stripe Machine. The Punch Machine can punch one, two, or three holes, either square or circular. The Rotate Machine can rotate your product by 45, 90, 135, or 180 degrees to line it up for the other machines. The Stripe Machine paints a thin, medium, or thick stripe across the product. The product itself looks something like a floppy disk, square and flat, but after it goes through the factory it sports whatever stripes and holes you have decided upon.

Once you know how to produce a product, the real game begins. You have two options. You can either produce a product and challenge another player to reproduce it by setting up his or her own factory, or you can play against the computer, and figure out different ways to produce the same effect. Your factory holds a maximum of eight machines, but you rarely need that many.

I think *The Factory* an excellent program for younger children. The graphics are great, with machines turning and spraying and punching very effectively when turning out the product. Figuring the rotation angles is especially challenging and makes up a great part of the fun of setting up a factory. Since you can't see what's

happening while the product is on the assembly line, the excitement and suspense build up as you wait to see if it will come out as you intended. Older children will enjoy the game as it stands, but I can think of additions that would make it more appealing to them and to adults (such as simulations of decision making by a production manager, scheduling, or even arcade style action). Despite these suggestions and my wish to see this sort of program at a lower price to accommodate home users, this is a superior game. Good work, Sunburst.

THE GRANITE POINT GHOST

Spinnaker Software
$44.95
48K; II/II+/IIe

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	C	*Value for Money*

Grades: 4-8

An educational program that teaches an organizational approach to deductive reasoning along with a bit of map-making doesn't always have to be dull and tedious learning. Spinnaker proves the point with a new series of interesting educational programs called *Snooper Troops*. The first, a mystery called *The Granite Point Ghost* by Tom Snyder, is well suited to students in grades four through eight. Besides the general learning value that it imparts in the process of solving a mystery, it is great fun to play. In fact, many of the parents will become involved solving the mystery too.

The game, in hi-res graphics, takes place in the town of Granite Point. The mystery involves a family that has moved into a large mansion in a small town. For several weeks strange things have been happening late at night. Some say the house is haunted, but maybe someone is just trying to give the family a bad scare. Now that a valuable Siamese cat is missing from a locked bedroom, a Snooper Troop detective has been called in on the case. You play the detective.

The detective gets to drive around town in his "Snoopmobile," mapping the town as he goes, and taking statements from suspects. He can make telephone calls from booths to suspects, informers, or the infamous Mr. X. He can even snoop or search a suspect's unoccupied home.

The house snooping is possibly the most enjoyable part of the entire game. The houses are dark, but you have a flashlight. When you enter, the screen displays the walls of the house and the clues along with question marks. You must move to the question mark and take a picture with your "Snoopmatic" camera, then exit without being caught. It's rare to be caught (you usually plan the search on a night when the suspect is known to be out); but if you are caught, you simply start over the following night.

Each of the suspects has three clues to give, each phone contact another three, and each home searched yields a final three. All are numbered, and you must write them down in your clue book. Additionally, there are special message clues that you get through the "Snoopnet" computer at headquarters, so you must hurry back before the end of the day to pick up your messages. Drive carefully and not too fast, for if you crash, you'll end up losing valuable time at the tow yard.

The mystery is very structured. Once you're ready to make an accusation, you do so. However, you must eliminate every other suspect by identifying the clue that exonerates him or her, and then name the means and motive of the guilty party. This is not a simple guessing game, but a serious challenge for the child.

The game is played on the keyboard using the A, W, D, X keys for steering, the S key for stopping, and the space bar for entering and leaving headquarters, phone booths, and houses. The space bar also turns the flashlight on and off and takes "Snoopshots." As our Snoopmobile travels around town, the screens change from one view to the next. Although the game isn't in real time, and is the same each time you play, a clock ticks off the hours and days of the week. Messages interrupt frequently with news and tips. Sometimes I think these messages are distracting, but this is true in all police and detective work. Incidently, there is no game save option.

The game is exceptionally well-done. It is cute, obviously appropriate for children, and not too difficult. Although this is not geared for a classroom environment, it certainly useful for teaching the art of solving a mystery in the home.

MEMORY CASTLE

Sunburst Education
$55.00
64K; II/IIe, Franklin

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 7 and up

Sometimes all the educational software written for home computers begins to look alike, which makes it all the more enjoyable to discover something different. As its name suggests, the game *Memory Castle* works to improve your memory and takes place in a castle. Actually, it's one of ten programs in a series designed to improve your memory. (You can get a catalog from Sunburst.) *Memory Castle* owes much to its manual, which outlines and explains the basic tenets of memory improvement, like using pictures to represent items in a list, or stories to illustrate a series of events. I would have liked to see these concepts illustrated within the program as well—they could have been demonstrated exceptionally well using computer graphics. Nonetheless, the game as it stands is wonderfully challenging.

The game tests your memory and gives you practice at remembering series of commands. The three levels of play range from easy (six instructions to remember) to medium (twelve instructions) to difficult (twenty instructions). I completed the medium level (barely), but the difficult level still intimidates me completely. The instructions are organized as movements to locations coupled with actions to take. For example, the easy level might offer you this:

1. Go to the shield room and get a shield with a cross on it.
2. Go to the cloak room and put on a green cloak.
3. Go the jewel room and choose a ring with an orange stone.

It's amazing how even such a simple set of commands becomes difficult to remember if you're not concentrating well. At the difficult level, you must use special memory techniques unless you have a naturally superb memory. Although the game tests you only up to twenty instructions at most, the same techniques have helped people remember hundreds of items. It can benefit children, or adults who want to improve their memory.

Memory Castle is both fun and interesting, but it does require close attention. One mistake and you lose instantly and must start again. If you work at it, it can be a truly educational game. Just remember the name—*Memory* uh...?

MIND MEMORY IMPROVEMENT COURSE, Step 1 & Step 2

Teach Yourself by Computer Software
$31.50 (Step 1), $36.50 (Step 2)
48K; II

Overall Rating	D	C	*Reliability*
Ease of Use	F	C	*Error Handling*
Documentation	B	D	*Value for Money*

Grades: 7 and up

Mind Memory Improvement Course has a copyright date of 1978 and indeed reflects 1978 software packages. It targets junior high school, senior high school, and adult students, an age range for students who most often take introductory courses in improving study skills (including memory techniques for studying). This program, along with an extended manual for classroom use, teaches and offers practice in Association (a copyrighted mnemonic system), and a memorization strategy called S O A RRR.

The program is written in Integer BASIC, which means that you cannot load and run it without first loading Integer BASIC. You cannot easily enter the program and you cannot exit without a Control-Reset. I called Teach Yourself by Computer Software and asked if they had an update to the program. The company representative that I spoke with told me that this is one of their earlier packages and has no update. She assured me that the packaging and advertising clearly state that the program is in Integer BASIC and was very willing for me to return the product with a note as to the reason for return.

The catalog appears after you "run hello" and you can then select a lesson. The program has no introductory screens, no instructions, and no preface, nor does it offer personalization for each student who works with it. You cannot choose the number of items to work on. If you fail to remember everything in a lesson, you must reenter the same lesson and go through it until you pass it. An accompanying cassette of listening/memory exercises adds another dimension of memory skills. In addition, the manual has working exercises to accompany the cassette.

Clearly the company could develop a better product. If you're looking for a memory training package, it would behoove you to seek a newer one that represents the state of the art in educational software. Teach Yourself by Computer Software has the beginnings of a good product here, one that would benefit teachers and students alike from junior high school through college. They should consider a revision of their program or take it off the market.

MASTER MATCH

Advanced Ideas, Inc.
$39.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	C-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	C-	*Value for Money*

Grades: 8-12

Master Match is a simulated TV game show which allows one or two players to find logical matches in images and words. It purports to aid visual learning and enhance memory skills while teaching vocabulary and concepts.

The object of the game is to pick matches from twelve numbered boxes. Matches may be made between words and definitions, words and pictures, or math problems and their answers. The catalog includes subjects for all ages.

The subjects vary from matching animal heads and tails to matching German travel phrases with their English equivalents. The matches are made by selecting pairs of numbers only, with no opportunity to develop more than a simple search strategy. Some matches are not that easy to figure out. For example, in one case you match countries and dates, presumably holidays, although there is no explanation of what the date means. You are not limited to the subjects on the Master Match disk; additional subject modules are available.

The best part of the program is the authoring system which allows you to create your own matches or change the program's subject areas. This feature is simple to use. Directions are clear both on the disk and in the manual.

The documentation is clearly written and thorough. Examples are given throughout. Some of the writing infers that it is addressing children directly, but the level requires at least an eighth grade reading ability. To be more effective with children, it would be helpful to add color and simplify the directions. The manual includes directions on Shift key modification, for lowercase, and instructions for special graphics characters to use in creating more subject disks.

This program is more challenging if played by two people; one person gets too much positive feedback. You are the winner of every game even if you pick only one match. Also, there are some graphics problems. For example, in the U.S. geography subject area, the images of the states are so small that you easily confuse two states of different sizes but the same approximate shape.

The problem with the program is that it allows little interaction, limiting its educational value. While it probably does enhance memory skills by making the person try to remember answers that didn't match for later use, that's about all it does. Some of the subject areas contain far too many "free" boxes which defeat the purpose of remembering match answers.

The TV game format is motivating at first; however, it becomes somewhat tedious after awhile. A more interactive program is needed.

THINK FAST

Brainpower, Inc.
$39.95
64K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B+	A	*Value for Money*

Grades: Adult

The producers of *Think Fast* promise measurable improvement in recall and recognition ability after several sessions with this product. (Improvement is measured by scores on *Think Fast* tests.) However, the program does not present the usual type of memory enhancment theory (such as remembering by association). *Think Fast* relies on research which shows that the two hemispheres of the brain (left and right) process different types of information. The program trains the two hemispheres by using letters and digits to improve verbal processing in the left hemisphere, and pattern blocks (graphics) for visual memory processing in the right hemisphere.

There are three major types of problems or trials presented in a test-taking format: comparing sets of letters, numbers, or graphics to determine of they are the same or different; copying sets of pattern blocks from one side of the screen to the other; recalling a set of letters, numbers, or graphics and reproducing them on the screen. Points given for each correct answer can be increased depending on the speed, difficulty, and risk level you choose. You can start a new session each time, or continue an old one. Each question is timed by an onscreen clock. Once the clock stops, no more points are given.

There are several levels in each trial; the program determines when you should move up. As you answer more advanced questions, the trial is interrupted by overlays which train the opposite hemisphere of the brain than the one you are working on.

You can save sessions on a separate disk, but since there is no allowance for using two drives, you must swap disks at certain points. Two types of reports can be printed out at the end of each session. One is a

summary report showing points scored and number of trials completed. The other is a complete report which shows, by hemisphere, the number of levels completed, trials missed because time ran out, and number of trials correct and incorrect.

Think Fast is one of the better educational programs I have seen. It certainly presents a different approach to memory training, and is a good value for the money.

MERRY CANNED NIGHTMARES AND DREAMS

Peachtree/Welcome Home Software

Merry Canned Nightmares and Dreams is an educational game that teaches goal setting, problem solving, and logical thinking. The game features excellent hi-res graphics and nifty animation as your characters walk through their surroundings. Two to four players may play (a solitaire mode is not available) and the game might best be enjoyed by children in the eight to twelve age group. For a complete review, see the Adventure Game section of this book.

Entrance Examinations

AMERICAN HISTORY ACHIEVEMENT I: Pre-Columbian-1860

Microcomputer Workshops Courseware
$49.95
48K; II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B-	B	*Value for Money*

This program provides excellent learning and reinforcement in basic history for college bound students. Its database of 1700 social studies questions and statements based on information in *The Complete Book of American Trivia* by Jay Hyams and Kathy Smith (Sammis Publishing), includes five categories and twenty-six sub-catagories offering random questions or a choice of questions on a specific subject matter.

Designed to provide comprehensive practice testing in early American history, the program produces tests similar in content and format to the College Board Entrance Examinations. The difference is that it allows the student two chances to answer the questions correctly.

There are five categories of questions: Intellectual History, Economic History, Foreign Policy, Political History, and Social History. Each catagory has three or more sub-catagories. The student can choose the subject areas or can let the computer decide. Scores, catagories, and number right are recorded and can be printed. Achievement scores are given if the student has chosen the All Catagories portion or upon completion of at least sixteen questions.

Since the questions are randomly generated, each session is different. Explanations accompany wrong answers and encouraging comments are given with each question. Each question consists of an incomplete sentence or statement followed by five possible completions.

If the student is unable to understand the question, the rephrase option presents further explanations of the five answers. Using the rephrase option provides additional instruction and does not effect student scores.

American History Achievement I is an individualized program which can be adapted to meet student's needs. It familiarizes students with college entrance testing format and, because it covers topics often overlooked in typical American history curricula. One drawback is the length of the pause between questions; this might adversly affect the student's interest.

When you print out individualized tests, they appear with only two questions per page, with a correction code in the corner. This means that a fifty question test on a slow printer takes twenty-five pages and about twenty minutes. You might as well write it out yourself.

Guarantee and disk replacement information was not included in the materials I received, but the package did include a backup disk and was fairly well-documented.

COMPUTER SAT

Harcourt Brace Jovanovich
$79.95
48K; II/II+/IIe/IIc; Applesoft

Overall Rating	C+	B+	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	C+	*Value for Money*

For years, publishers have made a living from study guides designed to help frightened high school students prepare for the SAT by showing them "practice exams." The guides are usually thick, intimidating books, more often purchased than studied. Now comes *Computer SAT*, a test preparation program for the Apple with programs on both sides of two disks, a *User's Manual*, and the familiar, thick study guide, *How to Prepare for the SAT*. The study guide is sold independently for one-tenth the price of this package, so a key consideration is what the computer program

provides that the study guide does not.

The computer program consists of four parts: (1) analysis of practice test results; (2) practice with 280 verbal items; (3) practice with 260 math items; and (4), practice with 1,000 vocabulary "flashcards." The program is easy to load and operate; the two disks can be conveniently used independently of each other. The *User's Manual* is a clear, easy-to-follow guide that leads you back and forth between the computer program and the study guide. For example, Disk A provides "answer sheets" for four practice tests which are actually in the study guide and not visible on the screen at all. The student simply records his answers on the computer, which keeps track of elapsed time. After completing all sections of the practice test, the computer will immediately score the test, showing which items were missed and giving both raw scores and converted scores for the verbal and math sections. Another menu option, the best feature of this program, provides a study plan analyzing what kind of item the student missed most often, thus identifying high priority study areas. Because such an analysis depends upon individual performance, this particular feature is available only in the computer program, and is not a duplication of anything available in the study guide.

The other three parts of the program are for study and review. Although the *User's Manual* recommends taking a practice test first, one can use these sections at any time. Both the verbal program (Disk B) and the math program (Disk C) time the student, tell him immediately whether the answer is correct or incorrect, and, if desired, explain the right answer, although the explanations are very brief and sometimes of little value. The vocabulary "flashcards" are the weakest part of the program. A word to be defined flashes on the screen, but the student is not required to commit himself before seeing the definition. He simply decides for himself whether he knows the word or not. This kind of word study, outside of any context, is one of the least effective ways to improve vocabulary; yet it seems to be an inevitable part of all the study guides.

Although this program will not make up for years of underachievement in school, it will simulate the pressure of a timed test. With the computer waiting for an answer and timing the response, it is hard to be casual even about a practice test. Its greatest benefit, then, is probably psychological; the student becomes familiar and comfortable with quickly answering the kinds of questions found on the SAT. This package is most cost-effective if purchased by schools and libraries where more than one student can use it.

ENGLISH ACHIEVEMENT I-V

Microcomputer Workshops
$39.95 each
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A-	C+	*Value for Money*

English Achievement I-V is a group of five programs designed to give students practice in the English grammar portion of the College Entrance Examination Board (CEEB) Composition Test. They provide basic drills in the categories of grammar, punctuation, diction, cliche, and mixed metaphor. English grammar is admittedly a dry and, for just about every student faced with the prospect of the CEEB, worrisome subject. While these packages offer no fancy trimming, graphics, or audio effects, they put the student through drills which, if repeated with diligence, can help improve his score on the exam. Scoring follows ETS. For each wrong answer a quarter of a point is subtracted from the total number right. At the end of a sixteen problem drill, the approximate English Achievement score (below 300 to 700 and above) is displayed. Each program offers complete instructions on how to proceed and opens with a sample problem.

English Achievement I presents a sentence with an error in either punctuation or grammar, and the student must determine what this error is from the choices presented on screen. For example, the program gives the following sentence:

> Melville's books are among Mr. Pike's most cherished possession. Each being more loved than the next.

In this instance the error exists in the sentence fragment (correct the sentence by replacing the period with a comma—possessions, each being more...). One very important feature is that after each sentence the computer indicates whether the choice was correct or incorrect, and gives an *explanation* in either event, of the corrected version.

English Achievement II sets up problems of the type designed to test the student's knowledge of correct usage: diction, wordiness, grammar, cliche, and mixed metaphor are covered. The drill awards correct responses by flashing cutesy, but encouraging messages:

> Keep trying! You'll catch on.
> Correct answer was 3.
> Error was faulty comparison.

After completing the set of sixteen questions, you may review your score, print the results, end the program, or do another set of problems.

The objective in each achievement test is clearly stated. *Achievement III* attempts "to give students practice in preparing for the variation format of the CEEB English Achievement Test." This is best explained with the use of an example.

Many *objected to him* being chosen.

1. did object to his
2. resented him
3. objected to his
4. had objected to him
5. the original is best

The above sentence contains an error in pronoun case, and the explanation to the correct answer, #3, is to use the possessive case before the gerund "being." As an added note, there is ample opportunity for variation and practice as each test in the Apple series contains 200 sentences. *Achievement Tests IV and V,* finally, allow students practice in preparing for the labeling format and editing format of the CEEB.

Each drill ends with an Analysis of Errors which is very useful to the student. This portion gives the percentage of errors in each category (ie. subject/verb, shift in voice, pronoun agreement), allowing the student to tell at a glance his or her area of weakness and where improvement is needed. The educational value of this error review is self-evident. I suggest that the user begin printing these results from the first session with the computer. As he advances and his mistakes are more easily recognized, his score *will* improve; and the printouts down along the road will be a source of positive reinforcement.

Microcomputer Workshops has designed a fine educational series that will be extremely useful to the student in preparation for the CEEB exam. The computer, an infinetely patient tool, is put to good use in helping the student strengthen his grammar. Although I think the disk version is overpriced, I'd still recommend the investment in the entire set of five programs.

FRENCH ACHIEVEMENT I

Microcomputer Workshops
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

French Achievement I is one of a series of programs by Microcomputer Workshops designed to give students practice in preparing for the vocabulary section of the CEEB Achievement Test. The method is to fill in the blank with one of four possible answers. You may also skip the question if you don't know the answer and return to it later.

The program's responses to your answers are often amusing and offer positive reinforcement to the student. If you are correct, the answers are pretty straightforward such as: *c'est vrai, d'accord, or tres bien!* You are then given the option to ask for the translation, define any of the words, or continue to the next question. On the other hand, if you make a mistake, you might get messages like: *quand meme, helas,* and *desole*! The translation is given and, as before, you can go over the definitions of any of the words, or continue to the next question.

After you finish the set of twenty questions, your approximate ETS French Achievement score (below 300 to 700+), appears on screen along with your right and wrong answers and the number of problems you skipped. If you wish to try another set of problems, the next score reflects both tests. The program next provides a list of the words which you missed. Definitions for all the words are available for review; verb infinitives and nouns are given along with their gender. Finally, you may review your mistakes, try another set of problems, or end the program.

The program uses a hi-res display of the entire French character set, including all types of accents. There is a total of 150 problems, each with options, explanations, and translations. The program's French dictionary contains over 600 words.

This menu-driven program is very easy to use, and the documentation provided with the program is very clear and concise. The disk itself is copy-protected, and there is no provision made for a back-up. *French Achievement I* would be a valuable addition to the classroom, or to the individual student studying for the CEEB at home.

FRENCH ACHIEVEMENT II

Microcomputer Workshops
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B+	*Value for Money*

French Achievement II gives students in grades ten through twelve practice in French grammar before taking the grammar section of the College Entrance Examination Board French Achievement Test. It is the second in a series of programs covering all segments of the French Achievement Test. The program consists of a general review of Levels III, IV, and V. It employs the entire French character set as well as upper- and lower-case display. Sixteen grammatical categories include a total of 196 problems. The format resembles that of the the CEEB French Achievement Test.

The program guides you toward an understanding of the grammatical principles of French while familiarizing you with the type of questions used in the test. You see explanations of both right and wrong answers, translations, suggestions (hints), and get the opportunity to try again if you incorrectly answered the first time. The questions occur either randomly or sequentially. The authors programmed close to one hundred responses into the computer; the comments congratulate or encourage you appropriately. If you need a hint while studying the "Si" and "Quand" clause categories, you can call up a reference chart. At the end of the session, you see the number of right answers (first or second attempt), an evaluation on how to use hints, your approximate Achievement Test score (only if you answered randomly generated questions and didn't use any hints), and a breakdown of the right and wrong answers according to the topic.

You can use *French Achievement II* in the classroom, but you'll need teacher instruction to cover any new material first. Otherwise, you can use the program for a class review if your school has a large computer facility. Students may want to use the program individually because it is ideally suited for home use. Teachers may want to coordinate review assignments with classroom practice.

MASTERING THE COLLEGE BOARD ACHIEVEMENT TEST: ENGLISH COMPOSITION

CBS Software
$170.00
48K; IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	B-	*Value for Money*

The national falling-off in basic skills, exemplified by dropping college entrance exam scores, has caused much well publicized breast beating by educators. The English Composition Achievement Test (ECAT) provides a major barometer of communication skills. With the five disks that make up this program, CBS Software provides comprehensive drill and practice in answering the types of questions asked on the English Composition Achievement Test. It instructs, or refreshes, correct usage and the finer points of style and diction. Even accomplished writers will discover bad habits or holes in their knowledge.

The menu-driven program is straightforward and easily used, with brief instructions preceding each type of drill. Disks 2 and 4 cover specific types of error labeling questions. Disk 1 requires selection from underlined choices; disk 3 covers usage variations; and disk 5 asks you to properly edit sentences. The program retrieves random questions from a central data bank and presents them in groups of sixteen. After the last question in the set, you receive an approximate score, indicating what you might expect on the actual ECAT, and an error analysis outlining your problem areas. You may then review the analysis, print out the results, proceed to another question set, or exit.

The program offers valuable feedback on every question, whether you answered it right or not. The little voice in the computer replies with something like "Right! You're a good student" or "Wrong! Hang in there!" The responses are encouraging and sometimes remind you that "You made that error before!" The program highlights the offending word or sentence segment and fully explains the correct answer. Certainly the complexity of English, a direct result of its richness and flexibility, fosters errors. The possibilities for error include fragments and run-on sentences, punctuation, diction, cliches, grammar, faulty comparison, pronoun reference, tense, case, mixed metaphors, parallel structure, voice, wordiness, and many, many more. The program addresses the wide spectrum of pitfalls with test sentences ranging from comparitively easy to very subtle indeed.

Scoring emulates the system used by the Educational Testing Service; you lose a quarter of a point for every wrong answer. You get an approximate score after each block of questions, but the program updates the score and analysis after each set, so that the score remains cumulative.

Even accomplished writers will discover bad habits or holes in their knowledge, but it is, of course, especially recommended for secondary schools. The drills, presented in a 40-column format with uppercase and lowercase, are self-explanatory and easily used. The price seems steep, but so are the mountains of knowledge offered.

A labeling question looks like this:

> The adventures of Sam Snick, detective and lover are followed more than those of any other hero.
> 1. Error in agreement
> 2. Error in comparison
> 3. Faulty parallelism
> 4. Error in punctation
> 5. None of the above
> 6. Skip question
> Answer? _____

If you punch in number 2, the program answers:

> Sorry! Some of these questions are tricky! Correct answer was 4. Error was punctation. Correction: ...lover, are... (The apositive phrase must be set off with commas.)

The editing section asks you to perform the tougher job of rewriting a sentence to make it correct. This section involves tricky points of usage. For example:

> When Odysseus entered the room, no one recognized him.

Using highlighting, the program then asks you to substitute "On entering" for "When Odysseus entered" and complete the sentence with:

> 1. , no one recognized
> 2. no one recognized
> 3. he was recognized by
> 4. , he was recognized by
> 5.—no one recognized
> 6. skip sentence

If you enter answer 1, the program says:

> Sorry, in number 1 the mistake is a dangling element. Well, it was your first try! Press return for next sentence or "R" to see rewrite and explanation.

When you press "R" you see:

> Rewrite: On entering the room, he was recognized by no one.
> Problem: The subject of the main clause must be changed to "he" to avoid a dangling participle.

This should give you some idea of how the program works and the types of questions it asks.

MASTERING THE GRE

CBS Software
$150.00
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

The Graduate Record Examination (GRE) is a service of the Educational Testing Service offered to graduate and professional schools for screening its applicants for admission and fellowship consideration. The General Test (required by almost all institutes that require the GRE) measures overall scholarly aptitude through a series of questions that test your ability to reason. With four disks and a skillfully written Test Preparation Workbook, *Mastering the GRE* trains you to achieve a high score on the General Test using the same approach.

Questions are broken down into three broad divisions both on the exam and in this package: verbal, quantitative, and analytical reasoning. Questions are further subdivided into a number of categories. For example, the verbal portion covers questions on reading comprehension, word analogies, antonym relationships, and sentence completion. After selecting a broad division and subcategory, you learn systematic strategies using common sense and reasoning, and apply these strategies to answering practice questions. After sufficient drilling, you are ready to simulate the actual GRE experience by taking two full length practice examinations. One of these is on the disk and is scored by the computer, the other is in the Workbook and scored by you with the answers provided.

Also contained in the Workbook are rules (e.g., arithmetic, algebraic, geometric, etc.) which the program prompts you to read and study each time you enter the strategy segment. This interaction between software and Workbook makes for a very effective learning experience. Unlike many other programs of this type that only tell you whether your answer is correct or incorrect, *Mastering the GRE* offers a complete explanation for the correct answer to each question and a justification for why the other multiple-choice answers are incorrect.

While there are no guarantees you will score high on the GRE, using this program is sure to enhance your chances of doing so. The price is steep but justified by the quality of the program. Every detail is well thought out, it is easy to use and flawless in performance. In my estimation, there is no better way of mastering the GRE than with *Mastering the GRE*.

MASTERING THE SAT

CBS Software
$150.00
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B-	*Value for Money*

The great yearly sorting of college bound high school seniors depends upon two major criteria: cumulative grades and the Scholastic Aptitude Test (SAT). Short-term cramming will hardly ensure an impressive score, but *Mastering the SAT* familiarizes you with the mechanics of the test, provides comprehensive drills in problem areas, gives clear instructional feedback, and is a fairly good predictor of your test readiness.

The program has three separate subtests, all multiple choice. The eighty-five question verbal section measures verbal reasoning ability, vocabulary, and reading comprehension. The sixty question mathematics section assesses your abilities in arithmetic, algebra, and geometry. The fifty question test on standard written English measures grammar, usage, sentence correction, and punctuation. *Mastering the SAT* uses the standard scoring system of computing raw scores by awarding four points for a correct answer and subtracting one point for an incorrect answer. The program then scales the raw score into a final tally between 200 and 800. A management program can keep track of three test takers at a time and allows you to exit the test and return later. The program does not contain a built-in timer (a minor drawback) which could have contributed to the time-management tension and spirit of the real McCoy.

The SAT simulation makes up only part of the package, and not the largest part at that. The disks also contain pre-tests consisting of a series of short examinations in the three major subject areas. Skill-building routines include: concentrated drills in opposites, analogies, sentence completion, reading comprehension, arithmetic, algebra, geometry, quantitative comparison, and vocabulary development. During these exercises the program tells you if you have answered correctly and explains the problem. If wrong, you receive instruction. The skill-builders are full of advice and hints on wrong answers and explain the correct answer after two guesses. The pre-tests, as with the SAT part of the program, don't reveal the results until you have completed the specific examination. You can then return to skipped questions and review either all of the answers or just the wrong ones. You also see your score broken down in the categories of the questions asked. For example, under the heading of verbal analogies you may discover that you are weak in cause and effect relationships but adept at spotting antonyms and synonyms. The thoroughness of feedback and the comprehensive analyses of your responses make the strong points of the package.

The questions are displayed straightforwardly, in forty columns, upper- and lowercase. The mathematics symbols and the Hi-Res geometric illustrations are quite clear. The menus and submenus are well thought out and make the options easy to use.

Mastering the SAT comes with a 142-page manual consisting of a series of simulated tests which give you thorough pencil and paper drills, plus test-taking strategies, advice on how best to use the program, and instructions on analyzing your performance.

Overall, I thought the package well conceived and professionally produced. Whether or not this program will raise your SAT score dramatically seems a perilous prediction, but it will at least remove that normal sense of bewilderment when you enter the test hall.

NTE PREPARATION SERIES

Krell Software Corp.
$229.95
48K; II/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C	*Value for Money*

Krell, the company that markets so many programs to prepare students for standardized exams, has finally done something for the teacher. *National Teacher Exam Preparations Series* is a set of eleven disks providing computerized drill and practice for educators faced with the ever more common requirement of taking the National Teacher Exam.

The package features eight disks produced specifically for NTE test preparation. Their titles and a brief description of each are below.

Test of Professional Knowledge: tests your understanding of instructional methods, class planning, measuring student progress, student evaluation, teacher professionalism, and government policy using multiple choice or true/false questions.

Test of General Knowledge: multiple choice questions on literature, art, science, social studies, and mathematics.

Reading with Precision: you read a set of passages in

the user's booklet and the program tests your comprehension and analysis skill. The passages are quite difficult reading.

Social Science: multiple choice or true/false questions on history, geography, political science, and the like.

Natural Science: multiple choice or true/false questions on high school level science.

Math Disk: seven sets of multiple choice problems emphasizing pre-algebra, algebra, plane and solid geometry, and reading graphs and tables.

Additional Math Programs 1): continuation of Math Disk with three additional sets of problems.

Additional Math Programs 2): three more problem sets.

To round out the package, Krell also encloses three addition disks, described below, that can be purchased separately.

Connections in Time: a history game that tests your ability to place important events in chronological order.

Connections in Time Data Creation Disk: enables you to customize your game to include historical events chosen of your choice.

Grammar, What Big Teeth You Have: Comprehensive grammar drill that requires you to identify grammatical errors in sentences. Its cute name suggests that it is entertaining; this is definitely not the case.

The most ambitious program in the package is Grammar, What Big Teeth You Have. Its lessons provide drill and practice in all aspects of grammar and usage. They sharpen your ability to recognize style errors in diction, verb tense, mood, agreement, redundancy, punctuation, and spelling. Most of the twenty-eight lessons focus on a single error type. You may select whatever emphasis meets your needs. The Automatic Learning Feature ensures you will not get bogged down in repetitive questions. Along with the disk comes a 134-page booklet explaining every error type. The cautious user will study this written material before plunging in. Special features of Grammar include its detailed score analysis given after each lesson. It even has an option allowing you to print out hard copy of tests for class use. My only complaint with this disk is that the lessons are slow to load. Grammarians must have great patience.

The three math disks offer some interesting features which utilize the computer's capabilities well. After each question you are immediately told if your answer is correct. You can then ask for an explanation of the correct solution or you may request another problem of the same type. Such features give you the sense that the computer is working for you. Through the Automatic Learning Feature the program keeps track of your strengths and weaknesses; the problems become increasingly more relevant for you.

I found Reading for Precision to be the most laborious and troublesome of the disks. The program is simple enough in design—you read forty-five passages, averaging about one page in length, from the booklet supplied. The program then quizzes you on the content and interpretation of the readings. The quizzes are not timed, so you can take as long as you like. What makes the exercise laborious is that the passages, mostly on political science or philosophy, are all extremely difficult. Furthermore, the quizzes draw questions randomly from all forty-five readings. For a respectable score you must constantly read and reread the passages. The program has no reward system, offers no help on wrong answers, and makes no attempt to adjust the level of difficulty to the user. In short, it lacks many of the attributes of good educational software that are present in the other programs in the series.

Connections in Time is a new approach to applying computers to social studies. Basically, it's a game which tests the player's ability to put historical events into chronological order. You can use the database supplied or create your own. The correct solution to a game results in a series of historical events being positioned correctly on a time line. The task of ordering the events is educational only if it stimulates discussion among the players. History has a richness which transcends the mere organization of dates.

In my opinion, the least valuable disks in the package are Test of General Knowledge, Test of Professional Knowledge, Social Science, and Natural Science. These programs do little more than present you with a battery of multiple choice or true/false questions, many of which are awkwardly phrased. The quizzes are slow to load and boring to complete. They offer little more than electronic page turning. This is computer aided instruction at its worst. Teachers wishing to cram for these subjects on the NTE would be better advised to play a game of Trivial Pursuit.

In the final analysis, the worth of this package depends on the level of user determination. The various programs will win no new converts to the use of computers in education. People who would rather curl up with a good book should continue to do so.

PERFECT SCORE

Mindscape, Inc.
$69.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B+	A	*Value for Money*

Perfect Score is an elaborate package that helps students prepare for the Scholastic Aptitude Test. The package consists of five double-sided study disks, a simulated test disk, and a user's manual which contains additional information on the SAT, test-taking strategies, and vocabulary and math review sections. The test disk includes a series of timed, simulated SAT tests and a sample test of Standard Written English, which is part of the SAT.

Each study disk contains ten sets of ten questions each covering the major areas of the SAT: Antonyms, Analogies, Sentence Completion, Reading Comprehension, and Math. Questions are randomly generated in the learning mode to allow different questions and answers each time.

The multiple choice questions may be answered in the testing mode or the learning mode. The testing mode simply scores answers as right or wrong, giving the total score and elapsed time at the end. Incorrect answers may be reviewed. In the learning mode, correct answers are reinforced and an option given to see why the answer is correct. Wrong answers elicit a sometimes sarcastic response, a lesson about why the answer is wrong, and another chance to answer correctly. After two wrong answers, an automatic Help function generates a hint. After three incorrect responses the correct answer is given. A scorecard is generated at the end of each section with the percentage of correct answers. (Some points are given in the learning mode for second and third tries.) This scorecard may be printed out as a progress record.

The test disk tries to simulate the actual SAT, and has some nice features; for instance, allowing the student to skip difficult questions to answer later. This sound test-taking strategy is useful during the actual SAT. In all modes, the student can turn on a clock to keep track of elapsed time. Each section should take no more than ten minutes. Scores on the test disk are scaled so the student can approximate how he might do on the SAT.

Perfect Score is easy to use and thoughtfully constructed. The vocabulary and math review section in the manual is extremely useful, too. The passages for reading comprehension are printed in the manual, allowing a more realistic reading mode than if they were displayed on the screen. This also allows the student to review the passage while answering the questions, as he might during the test. Some of the vocabulary and reading passages are fairly difficult, but the SAT isn't easy either.

This program cannot guarantee a "perfect score" on the SAT. No tutorial program can substitute for a lifetime of good reading and study habits, but it will help students develop test-taking skills and understand how tests are constructed. While low SAT scores do not mean the student cannot succeed in college, they do make it harder to get in. Overall, the program is well designed, relatively inexpensive, and should help any college bound student, or anyone facing employment or aptitude tests similar to the SAT.

PSAT/SAT ANALOGIES

Peachtree
$49.00
48K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	A	*Value for Money*

With this package Peachtree joins a dozen or more publishers offering help to high school students preparing for college board exams. The many packages available range considerably in scope, teaching method, and cost. *PSAT/SAT Analogies* is at the low end of the price range, but for what you pay, you get a lot.

The package consists of two disks and accompanying documentation. The first-time user should begin with the Developmental (or Program) Disk. It offers three kinds of help: instruction, testing with coaching, and testing with time pressure applied. First you choose the category of analogy you want to work on: Synonyms and Antonyms, Characteristics, Parts and Wholes, Time and Place, Doers and Their Actions, and Actions. Understanding these catagories is a first step in becoming skilled at analogies.

With a category chosen, you may next request tutoring, which consists of a brief explanation of the analogy type and an example. The example places analogy words into sentences which illuminate their relationships and, thereby, develops your analytical abilties. The sentences might be, "To STUDY is to seek EDUCATION. To STEAL is to seek PROPERTY." You next try some practice problems on your own. If you give a wrong answer the program constructs sentences with the words to clarify your thinking. You then try

again. The program keeps a running score on your performance. Finally, you can advance to a timed test. Each question in this test has a thirty second limit. A digital timer at the bottom of the screen serves as a constant reminder. No explanations or second chances are given.

The Diagnostic Disk is rather similar. It is more challenging, however, in that it selects analogies from all categories randomly. Also, it has no introductory tutorials.

As you would expect, this low-cost package lacks features found in more expensive products. The subject matter is limited. Obviously, it offers no help in math, but other areas of the English portion of the PSAT/SAT are left out, too. Further, note that the "timed" tests merely offer timed questions. More costly packages simulate full-length SAT, tests complete with authentic scoring.

Attractive features of this package include the ease with which you can exit from an exercise at any time. Teachers will appreciate the Student Record Management system which allows you to create a roster of users whose scores will be saved on the disk for later recall. The weakest part of this package is its documentation, which is more difficult to master than the software itself. Despite the slick paper it is printed on, the user's manual is a second class piece of work. It is verbose, confusing, and often out of touch with the program it is supposed to describe. I recommend you bypass it initially and discover this program by trial and error. Peachtree's user support consists of a $5 charge for replacement of a damaged disk and a pledge to provide future upgraded versions at special prices.

SAT ENGLISH I

Microlab
$30.00
48K; II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B-	*Value for Money*

SAT English I offers students preparing for the SAT college entrance examination the types of questions and the levels of complexity the student will encounter on the exam. These include sentence completion, analogies, antonyms, grammar and usage, and reading comprehension questions. The program's demanding vocabulary and challenging grammar questions present students with the opportunity to develop or refine the thinking strategies and verbal skills necessary to succeed on the exam.

The program contains several desirable elements. It is menu-driven and thus easy to use. The instructions given at the beginning of each section contain clear directions and helpful hints. The program provides four special key choices, such as pressing S for Skip, that allow the student to move quickly within each section and through the program itself. A student's score is given in percentage form at the end of both the tutorial and testing modes.

Two features of this program make it especially commendable. The program accurately presents the diversity of verbal relationships contained in SAT questions. The questions require the student to use inference, to recognize meaning in context as well as in direct statement and to determine the best choice among several answers that may seem correct. But the best aspect of this program is its treatment of correct and incorrect responses. The thinking behind the appropriateness of each answer is explained logically and sensibly, so that the student can build vocabulary and thinking skills beyond merely selecting the correct choice.

Despite all of these positive features, there are some drawbacks. For example, the program gives no consideration to time limitation, which is an important feature of the SAT exam experience. Also, new material loads very slowly; this feature is particularly frustrating in the testing mode. Finally, and most importantly, despite the fact that both sides of the disk contain practice on four of the types of questions (Reading Comprehension is only presented once), the number of questions is limited to thirty-six sentence completion, thirty-five analogy, thirty-five antonym, twenty-six grammar and usage, and sixteen reading comprehension items. A parent buying this program must recognize that this limited practice will not replace thinking or verbal skills developed over many years; however, the interactive nature of the program may well make it valuable for some students.

SAT MATH I

MicroLab, Inc.
$30.00
48K; II/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

SAT Math I has four main functions: to help familiarize students with the type of questions found on the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board; to help a student gain more math knowledge; to help a student build his self-confidence; and to help a student reduce test anxiety. I believe that the program generally succeeds in all of these categories. Although I don't believe it will significantly raise student scores, it should elevate them somewhat.

Four sections on each side of the program disk cover many mathematical concepts: algebra, geometry, logic, graphing, probability, exponents, square roots, negative numbers, fractions, and various arithmetical operations and concepts. Each section allows you to go through the section in either a tutorial or a test mode. The tutorial mode presents the problem and offers you four answers to choose from. If you choose the right answer, the program says so and usually shows you one method of arriving at the answer. If you answer incorrectly, the program tells you why that answer is not correct. (The wrong answers represent likely solutions reached when you follow slightly incorrect logic in solving the problems.) Even if you get the problem right on the first try, I highly recommend looking at the reasons for each of the incorrect answers to gain further insight. The test mode gives you the problems in test format, but supplies no reasons for wrong answers. The pre-test and post-test help you gauge how much you know before starting the program and how much you have gotten out of it.

Both the tutorial and the test modes allow you to exit early. The tutorial mode also periodically offers various Help screens, plus additional drills in many parts. These drills strengthen your skills. Another nice feature is the ability to skip ahead. Moreover, both modes give you an evaluation of your performance at the end of each segment.

The program does make one assumption: that you have an elementary background in math, algebra, geometry, and quantitative problems. I found many of the problems *very* similar to those found on SAT tests in the past.

SAT Math I works very well. It screens out both erroneous and extraneous values entered from the keyboard. It is menu-driven and quite easy to use. Sometimes it seems a bit slow because of all the textual material that it loads from the disk into memory, but I didn't find the time taken objectionable. The company has a thirty-day warranty period, with a replacement fee if the disk fails after the thirty days. The package makes no mention of backup disks because the program disk is unprotected. The documentation that comes with the program offers some excellent study tips.

A management system to track your progress and print out a summary of your strong and weak points would really benefit this program. However, even without a management system, I found the program relatively smooth running, instructive, clear and concise—and a definite plus for someone studying for the math section of the SAT test. At $30, it would certainly be money well-spent.

SPANISH ACHIEVEMENT I

Microcomputer Workshops
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Spanish Achievement I, one of a projected series of disks designed to give tenth to twelfth grade students practice with the type of questions used in the CEEB Spanish Achievement Test, contains 150 multiple choice problems presented either randomly or in sequence. The package contains one disk, plus several pages of documentation outlining the objectives of the program and giving ample instructions and suggestions for classroom and individual use. The program is menu-driven with all necessary instructions displayed on the screen. To answer a question, you type one number to indicate your choice among the four possible answers. After you enter the response, the correct choice lights up and two of a series of Spanish comments appear, all appropriate and encouraging, some even funny. An incorrect answer provokes mildly negative responses. After this, a single keystroke brings a display of the English translation and definition of any choice, with an explanation of why it was correct or incorrect. When you complete a group of twenty questions, the score is displayed. The score, compiled as in an ETS examination, also shows the number right, the number wrong, and the number skipped. You can call

up a dictionary display showing verbs in the infinitive form and the gender of nouns.

Spanish Achievement I is a thorough, well-written, well-presented way to practice for an examination or reinforce comprehension skills.

SPANISH ACHIEVEMENT II

Microcomputer Workshops
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

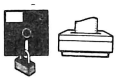
The second in a projected series of programs designed to give high school students practice in the specific skills tested by the College Board Examination, *Spanish Achievement II* provides practice with Spanish grammar. Five pages of documentation accompany the single disk; they describe the programs and provide instructions for classroom and individual use.

The format of this program resembles that of *Spanish Achievement I*. The program is menu-driven and clearly explained on the screen. You have some control of the program, but the authors designed it so that you see an explanation of correct usage after entering an answer to a question. From a bank of two hundred questions, you can choose to answer either ten problems on a specific grammar topic or twenty questions randomly selected from the fourteen major categories. Because of the ratio of categories to questions, the questions begin to repeat as you use the program frequently. Each problem comes with four possible answers. You can choose among them or skip the question. If you have decided to review one grammar topic instead of using the examination format, you can also request a hint. Each choice evokes a comment from the program—either an enthusiastic exclamation or a mildly negative one—depending upon whether your answer is correct or incorrect. After two attempts, an arrow indicates the right answer. Once the explanation has appeared, you can also request a translation of the sentence used in the problem plus explanations of each of the choices. At the end of each session, you can review the questions you did not answer correctly.

Spanish Achievement II has a problem regarding both screen presentation and operation. Although most of the explanations are clear and concise, a few are not. For the problem "Luis se quito...fagas," the incorrect choice of "sus" brought this explanation: "incorrect accent possessive adjective." It should read "incorrect use of possessive adjective." Although the questions themselves were carefully planned, at least one explanation of an incorrect answer is wrong. "Vimos...coches en la carretera" is correctly answered by "cincuenta." The program evaluates another choice, "quinientos," as incorrect because of incorrect gender, but "coche" is masculine. However, the accompanying explanation of the correct answer gives the proper guidelines for usage. The translations are generally good, but sometimes clumsy. "They robbed the suitcase from Eugenia" shows the Spanish usage, but a correct English sentence should accompany it.

Once you have completed the series of questions, you can ask the program to display an analysis of your performance. If you chose the "random selection" option, the analysis appears in terms approximating the CEEB scores. Scores also show your performance in individual grammar topics and you can print them out for later evaluation. This segment of the program worked smoothly on a dot matrix printer, but when I tried it with a Comrex daisy wheel printer, the "select" toggle shut off after each line. I had to reset it manually to continue. With a Silentype and Apple IIe configuration, the disk did not automatically reboot after printing, even though a screen message indicated that it would. It did reboot after I pressed Return (which was not mentioned in the instructions).

In spite of these problems, the general quality of the program and its use of language, accents, and punctuation make it a useful review for the College Board Examination in Spanish.



Typing

KEYBOARDING ALPHA-PAC

South-Western Publishing Company
$89.50
48K; II+/IIe with shift key modification

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Keyboarding Alpha-Pac is one of the best "learn to type" programs that I have ever seen and is ideal for anyone without typing experience. The two program disks run on the Apple IIe, but you can use them on the II+ with the addition of the Shift key modification. The program employs extensive graphics to demonstrate key locations and which fingers press which keys. These pictures appear during the introduction as well as at different stages in the lessons. As you progress through the additional lessons, some of the same pictures reinforce previous instructions.

Eighteen lessons demonstrate the proper keypress and drill you on using the new keys you've learned. Most of the drills consist of repetitions of the letters you just learned and short sentences combining these with previous letters. As you continue, more and more keys join the list, including upper- and lowercase combinations. You easily learn all of the standard character, semicolon, space, and Return keys. You do not learn the numerical and special keys, which removes any chance of incompatibility between the two computers that run the program. The program prompts you when you make an error, forcing you to press the correct key before you can continue. In the latter half of each lesson, the program tells you how many errors you made while typing short sentences. If you have made more than a few errors, that particular part of the lesson is repeated. You also learn to type word strings instead of one letter at a time, which helps increase your speed and accuracy.

I found only a couple of minor problems with this package. First, one sheet of instructions tells you how to turn on your computer. That's it. The rest of the documentation occupied the disk itself and appears as a timed exercise at the very end, which judges speed alone, not accuracy. You do have the option of printing out your timed paragraph to check it for errors.

The program has a ninety-day (no warranty) warranty. What does that mean? In big, bold print it says "no warranty." The program comes on an "as is" basis. However, the company will replace defective disks free of charge. The price you pay for the program buys only its use, evidently; South-Western may request the return of the program at any time upon cessation of the software license. Anyway, it sure is something when you get more instructions on what you can or can't do with the disk, than on how to use the program!

LEARN TO TYPE

Arrays, Inc./Continental Software
$49.95
48K; Apple II+/IIe/IIc

Overall Rating	A-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	A	*Value for Money*

Learn To Type is designed for youngsters new to the computer keyboard, or for busy executives who still "hunt and peck" at their desktop computer system. The program takes you through increasing levels of difficulty, and measures your rate of improvement.

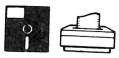
The program is divided into three sections. The beginning section is for those unacquainted with the keyboard. The computer screen shows an actual keyboard, with an illustration of a hand to show which fingers correspond to which keys, which is an improvement over other programs which assume you already know proper hand placement. Once you are in position, a line of text will appear on the screen for you to

copy. Useful prompts help you from straying too far unknowingly.

The second section works on speed and accuracy. The drill and practice section rates you on words per minute, telling you which fingers are slow and which are fast, so that you can improve. There is also an optional game in this section, called "Eraser Man." If you fall below thirty words-per-minute while you are typing, "Eraser Man" will appear to eat up your text, encouraging you to maintain speed.

Finally, once the first two sections are mastered, you can move on to the advanced third section. Five to ten pages of text will be displayed, and you must copy them to test yourself for accuracy. An editor/teacher mode is available at this level to set up your own lessons in areas in which you feel the need to improve.

Learn to Type is a well-designed program for mastering the keyboard, even for those who have never touched one before. You can choose between the Qwerty or new Dvorak keyboard layouts, so even a typist already familiar with the Qwerty layout will find this a useful program to learn the faster Dvorak layout.



LETTER-MAN

Behavioral Engineering
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	C	*Value for Money*

Letter-Man is a typing game played much like *Pac-Man*, but rather than moving in response to a joystick and eating dots, Letter-Man moves in response to the keyboard and eats letter characters (letters, numbers, and punctuation marks). Compensating for the loss of a tunnel, Letter-Man teleports from one corner to the opposite (diagonal) corner. Letter-Man eats "$" rather than energy pills to help him swallow gobblers.

To help beginners learn which fingers to use for which keys, a marker points to the correct finger on a display of the hands. Another option allows you to create your own maze. This is very easy to solve, but you don't know the exact location of each word.

Letter-Man is very easy to use. Special, high contrast graphics are provided if you are using a black and white monitor. Speed (how fast the gobblers chase you) can be adjusted from 10 to 150 words per minute.

Letter-Man is copy protected, but can be replaced for a $7.00 charge. If you want to learn to type and have fun doing it, this is the program for you.

MASTERTYPE

Scarborough Systems
$39.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

MasterType is one of the best selling educational programs on the market today. Its ambitious goal is to teach touch-typing skills through the use of video arcade game action. According to Scarborough, the package can be used by anyone from age seven to adult. In its original, one-disk version, *MasterType* offered nothing more than fast-action drill and practice. The "new improved" version attempts to correct this limitation. It adds a second disk of exercises with slower pace and more instructional content. In my opinion, the new emphasis is very welcome, but it does not go far enough to make this package a serious teaching tool.

The *MasterType* battle game is simple enough in principle. The action begins after you select a lesson on the basis of difficulty. Single letters of full words appear in the four corners of the screen. These words are your enemies. They try to destroy you by launching missiles at your command ship precariously positioned in the center of the screen. Your only defense is to get them before they get you. To zap them out of the sky, you simply type them. The game has a few subtleties and strategies which will interest only video arcade fans. The assumption behind the entire exercise is that pumping up your adrenalin will make you a better typist. Sometimes, no matter how well you can type, the enemy always ends up destroying you. This is very frustrating.

I like the new Training Ground disk, which according to the documentation "will prepare you for your first battle." Its introductory lesson presents an on-screen keyboard fingering chart complete with a pair of hands positioned on the home row. You press letters on your keyboard and the hands on the screen show you the fingering you should be using. This exercise is done entirely at your own pace. It could be improved by adding some required drills, such as practice with the familiar sequence: ASDF ;LKJ. The next lesson does prescribe the letters to strike and even dictates the

cadence for striking them. Hence, it introduces timing and the pressure needed for speed. An irritating sound signals each error you make. The next lesson requires you to type full sentences. After each sentence, you are given a words-per-minute score and a count of your errors. I found I could relieve my frustrations by a very quick typing of gibberish. The program credited me with 128 WPM despite my thirty-one errors! The final lesson is said to be training for the battle game. Its dubious goal is to prepare you to type under "real combat" conditions.

I must pause before taking exception to an overwhelming commercial success like *MasterType*. I will simply say that it can be entertaining and challenging. If you respond positively to video arcade action, it can even be educational. It should not, however, be confused with the more comprehensive and effective typing tutorials.

MASTERTYPE

Scarborough Systems Inc.
$40.00
48K; 13 or 16 sector (or Apple III in emulation mode)

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A-	B-	*Value for Money*

MasterType, in this new, improved version, is a progressive typing program with a difference: it incorporates an Invader-type game as it presents opportunities to practice typing skills. This version also incorporates finger positioning exercises and sentence practice to produce all the results of a traditional touch-typing course.

The typist is in command of the space ship at center screen. In the four corners of the screen appear letters, words, numbers, and/or other combinations of increasing complexity that the typist must quickly enter, in order to prevent their slow, but constant movement toward the ship, resulting in a collision that will produce damage. The collisions and/or the successful typing of one of the "enemy" phrases is rewarded with sound and color displays. There is a sequence of 10 such trials before a message appears to report both on the status of the ship and the speed of the typist in words per minute.

The diskette provides eighteen lessons. Lesson #1 starts with the letters A,S,D,F,G,H,J,K,L, and presents each letter in this home row as an "enemy" word. Lesson #2 presents two or three letter words of that row. Lesson #3 uses three, four, or five letter words of the same row. Lesson #4 moves to the third row, with the letters Q,W,E,R,T,Y,U,I,O,P. Lesson #5 provides short words using the home and third rows together, and so on up to lesson #18, which gives practice with difficult numbers and symbols. There is a MAKE LESSON on the diskette which allows the user to create lessons. They can be saved on the program diskette (never a wise option), or on a pre-initialized, 13-sector diskette.

Although the instructions specify that, in any mode other than Beginner, the typist should press the space bar to show completion of input, it is actually more desirable to press Return. Another suggestion in the manual states that to correct mistakes in typing, "press the space bar and try again. You will be penalized a few points for making a mistake, but you should have enough time to type the word again." It then states, "another way to correct your mistakes is to use the left arrow key to backspace over your mistake and retype it." In a word processing environment, the power of the computer is to simplify corrections. The use of the backspace to correct errors is to be encouraged, not avoided!

The advertising for this package implies that this form of play-teaching is effective, if not addictive. This reviewer has seen exactly such events take place—with a typing teacher and with students.

Although somewhat expensive, this improved version of *MasterType* is highly recommended.

TYPE WRITE

Barron Enterprises
$39.95
48K

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	C	*Value for Money*

This package is for the typing beginner who doesn't enjoy shooting aliens out of the sky. *Type Write* offers tutoring and drill in touch typing without the hype its more celebrated competitors provide.

The program is so easy to use that it has no written documentation. A few instructional screens at the beginning of the program and a bit of text preceding each lesson is all you need. A total of seventeen lessons take the novice typist through the full alphabet and takes the more advanced student to the point of typing

full sentences. The first lesson introduces the home keys. Using a tutorial format it explains proper fingering. It then presents progressively more difficult drills wherein you mimic sequences of letters, such as ALL, AKK, and LAD, appearing on the screen. The program provides occasional messages of encouragement and always stresses accuracy over speed. An eleven-year-old program tester said he appreciated its unrushed pace.

Some lessons depart from the mimic format and ask that you type whatever words you like, as long as they end with a specified ending. This game is realistic as well as entertaining—typists do not always copy words from a page or screen. Occasionally, a lesson will present a words-per-minute test which measures your skill level and rewards your hard work. The program has no provision for storing or documenting the test result, so Teacher will have to stroll by to see how the student is doing.

The only flaw in *Type Write* worth mentioning is its age. Produced in 1981 for the Apple II+, it operates entirely in uppercase. While this limitation may be acceptable for drill on single letters and words, it is a considerable shortcoming in the final lesson on whole sentences. The student gets no practice in use of the Shift key to capitalize the first letters of sentences. Barron Enterprises ought to update this product for the IIc and IIe user.

TYPING TUTOR II

Microsoft
$24.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

This progressive typing program not only teaches you to type, it helps you build faster typing skills. An innovative feature, Time Response Monitoring, monitors the keyboard. This enables the computer to monitor your speed on each individual key by checking your typing speed twenty times a second.

The excellent documentation includes an explanation of the characteristics unique to typing on a computer, in addition to details regarding the program itself. The menu begins with the basic keys and then proceeds to numbers and symbols. You choose the appropriate level and the type of lesson desired—either longer passages or a series of new letters. The documentation includes progress reports and evaluations. The program also offers options such as "allow slower response," which enables you to adjust the response time.

While there are some differences between the Apple II keyboard and a standard typewriter, you should adapt easily once you know the location of the keys. You will find *Typing Tutor II* a useful instructional program.

TYPING TUTOR III

Kriya Systems/Simon & Schuster
$49.95
64K; II/II+/IIe/IIc

Overall Rating	B-	A-	*Reliability*
Ease of Use	B-	A-	*Error Handling*
Documentation	A-	C-	*Value for Money*

Typing Tutor III is a sequel to the highly successful *Typing Tutor II* program sold through Microsoft. It adds some nice features, like a game (Letter Invaders), a complete manual on disk, a set of graphs showing your progress, and support for the numeric keypad. The program also has a unique provision, designing custom lessons for you based on the keys that you need to work on.

Gripes include: no teacher mode and no built-in lesson editor. In general, I expect a sequel to not only incorporate the features of earlier versions, but to surpass them. Such is not the case here. *Typing Tutor III* added some nice features while losing others. I can only guess that the manufacturers purposely omitted some features to avoid ownership problems, or because they rushed the program to market.

Overall, I thought the program well done. I experienced no problems with it. However, I feel it to be overpriced for what it offers.

Computer Literacy

APPLE WRITER IIe—An Introduction

Apple Computer, Inc.
$40.00
64K; IIe

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	B	*Value for Money*

Apple Writer IIe—An Introduction is a product training package for the *Apple Writer IIe* word processor put out by Apple Computer, Inc. It includes a manual and sample documents disk to be used in conjunction with the *Apple Writer IIe* program disk. The documents disk contains sample text files that you manipulate as directed by the tutorial.

Part One of the manual, "Getting The Basics," is a tutorial on the use of standard *Apple Writer IIe* editing commands. This part of the manual takes approximately one hour to study; and when you've finished, you will be able to create, edit, and print documents and reports using *Apple Writer IIe*. Part Two, "Moving On," explores such advanced word processing features as the use of embedded commands, document formatting, footnotes, and so forth. It takes less than two hours to complete this section.

Although the *Apple Writer IIe* manual includes a tutorial, I believe that the "hands on" experience promoted by this product training package will help you to quickly master the fundamental operations of *Apple Writer IIe*.

THE BANK STREET WRITER

Scholastic, Inc.
$69.95
64K II+); 128K (Apple IIe/IIc)

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A	*Value for Money*

If you thought that Broderbund publishes *The Bank Street Writer*, you are quite right. The Scholastic version belongs in the classroom, differing from the other version in providing you with extra documentation and a third copy of the program. If you feel adventurous, you can boot the disk and begin immediately. The easily understood onscreen prompts cover virtually every function of the program, while a tutorial on the reverse side of the program disk explains and demonstrates the important features. Although the program is copy-protected, you can copy the tutorial in order to introduce the program to students. The excellent manual and tutorial introduce the teacher to the program, while a simple student guide and question and answer section help students. You can reproduce these and hand them out to your class. The manual also contains student exercises for you to write out and store on disk. Students can retrieve them, work on them, and save them back to disk or hand in a printout of their answers. You can also create your own exercises or tests.

The program offers you three modes to choose from. The Write mode asks you to write, but also allows some insertion and deletion using the arrow keys (which takes some practice). The screen displays eighteen lines of thirty-eight characters. On the Apple II, you get both upper- and lowercase. Two other commands allow automatic line centering and indentation. The Edit mode lets you erase or move blocks of material up to fifteen lines in length, find and replace from one to twenty-nine characters anywhere in the text, and move the cursor anywhere on the screen. If you decide that

you mistakenly erased or moved a block, Unerase or Moveback restores the original. The Transfer mode lets you perform printing or disk operations. You can save and retrieve files from the disk, rename or delete them, and prepare a new data disk using the Init command. You can print out material in either rough draft or the final form, both offering a number of options. The draft form produces a double-spaced, thirty-eight character printout useful for proofreading. The final form produces a full page printout with some options as to format. You can assemble a new file by retrieving and saving bits and pieces of other files, and you can print files sequentially to produce a document larger than one file. A 48K Apple holds a 1,300-word file, while a 64K or IIe holds 3,200 words at one time, seventy pages per disk. A utility program lets you set up for one or two disk drives, change print format, handle lower case shift key additions (for the II or II+), and convert program and DOS text file formats.

Obviously, I have not covered all of the features available, but you should have a pretty good idea of what the program offers. It is not a full function word processor despite sophisticated features such as Find, Replace, Move, and Moveback. For example, it does not contain such simple features as sending printer commands from within the program. I liked printing files in chains to produce long documents, but when I tried it, I got a blank line between each file (my error?). Converting back and forth from program files to DOS files is handy, but painfully slow. I liked the editing commands, but not shifting modes to reposition the cursor on the page. Also, most changes occur immediately, but it takes about three seconds to go from Write to Edit. I thought the automatic line centering a blessing, and the indent feature nearly useless. I did not appreciate the eight space indent compared to the standard five spaces, but worse was being forced to indent a whole block of text because you cannot move the start of a line. I most disliked the thirty-eight character screen, because I much prefer to see the full page width and bigger blocks of text as I work.

Despite these complaints, my graded evaluation of *The Bank Street Writer* above shows how much I liked the program. If you need a really powerful word processor, look elsewhere. However, if you want to interest young people in writing or simply explore some of your own creative urges, I think you'll like this program.

THE B.A.S.I.C. TEACHER

AV Systems, Inc.
$49.95
48K; II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	C	C-	*Error Handling*
Documentation	C	C	*Value for Money*

BASIC is not necessarily basic. Without a little help in learning how to program your computer, even the most basic BASIC program could give you problems. By working with the disk as well as reading and listening to the included cassette, you can surmount these problems with this package. While it will not turn you into a professional, it does give you a working knowledge so that you can continue on your own.

The aim is to demonstrate how each of the common statements work. Generally, a very short program is run and listed. After studying the listing, you make specific changes and observe the difference between both versions. After you have worked with a particular command, you continue with the next one in line. There are over ninety different short programs that go through BASIC commands from ABS to XDRAW. It would take two to eight hours to complete this entire course at one sitting. After that, depending on your previous experience, you will probably refer back to the program frequently.

I like the ability to listen while being walked through a step at a time, and I enjoy the ability to see just how each command reacts when changed. Most of all, I like the instructions for reproducing the program disk and manual for as many students as necessary for classroom work. Many times, expensive programs have been lost by well-meaning, but inexperienced students.

The manual is vague at times, referring to the programs for explanations. Unfortunately, some of the more complicated terms need more than this. It would be nice if some reference material were listed, for those needing more advanced aid.

Remember, though, never END your NORMAL lessons without DRAWing the DATA FOR your NEXT NEW lesson before CLOSEing up the STORE, and RUNning HOME FOR the night. You never know what your POP may GET from a CALL To TRACE your whereabouts WHEN you were supposed TO be HOME READing your lessons. (See how easy it is to learn to program in BASIC?)

CDEX TRAINING FOR APPLE IIe

Cdex Corporation
$69.95
64K; IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B-	B+	*Value for Money*

Cdex Training for the Apple IIe comes to the aid of the poor novice left alone with nearly incomprehensible manuals. The novice needs an experienced user sitting beside him, telling him every keystroke. *Cdex Training* makes a good substitute.

If you can boot a disk, you can use this program. It consists of three disks and a brief guide. Disk 1 takes you through how to use the program, your first contact with the keyboard (including the DOS commands Catalog and Run), the components of a computer system, and using the keyboard. Disk 2 takes you through more DOS commands and, aided by the guide, gives an exercise in initializing and copying disks, the first of several exercises in the guide. Disk 3 takes you through such DOS functions as saving files, deleting files, changing a file name, protecting a file, removing file protection, and verifying files. Disk 3 also includes instruction in using DOS utility programs and briefly describes alternative operating systems and programming languages.

This Cdex program is well designed and slow paced. For example, the section called "Getting to Know the Apple IIe" gives instruction in carefully planned segments. The program actually draws a picture of a keyboard and says, "This is a keyboard"; a picture of a monitor and "This is a monitor." An instruction appears at the bottom of each screen, such as "Press C to continue" or "Press Return." You take a test after each section, but help is available even during the test. An option bar at the bottom of the screen lets you choose "H" for a hint, "R" to review the material before answering, "S" to skip the question, or "M" to return to the Main Menu. If you answer a question incorrectly, a depressing buzz, thump, or thud notifies you of the error and you get two more chances to answer correctly. A fanfare rewards the correct answer. (Adults might find the noise irritating, but teenagers seem to enjoy them.)

Reading a book would take less time if you just want to learn the information, but this program familiarizes you with the keyboard, DOS and BASIC commands, the computer system, and handling disks. You not only learn from the program, you begin to use the computer as well. The guide accompanying the program provides a simple reference manual, with the emphasis on simple. Most reference manuals give you every instruction you might ever use. This guide describes only the most commonly used DOS and BASIC commands and the exact sequence of keystrokes needed to carry them out, which also proves its carefully designed suitability for beginners. The Cdex program and a little practice should rapidly turn a beginner into a user.

CDEX TRAINING FOR VISICALC

Cdex Corporation
$69.95
64K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	B+	A-	*Value for Money*

VisiCalc was one of the best-selling spreadsheets in the United States. Its very popularity caused some problems; many people with no previous knowledge of spreadsheets purchased the program and were left baffled. For the true beginner, Cdex has produced a fine training program that shows, rather than tells, the power of *VisiCalc*.

Cdex Training for VisiCalc consists of three disks. After explaining how to use the program, Disks 1 and 2 take you through what you need to know to get started: the key terms used; how to move the cursor; how to label columns and rows; how to enter values and formulas; how to work with *VisiCalc* functions like minimum, maximum, average, sum, count; and how to save, retrieve, and print your spreadsheet. The *VisiCalc* manual tells you how to do this, too, but it is large and intimidating. *Cdex Training* permits you to put your hands on the keys, perform a keystroke as instructed, and see what *VisiCalc* can do. If you commit an error, the program tells you immediately with a thud, buzz, or bump, and provides hints for trying the exercise again. Fanfares and praise reward correct answers. Disk 3 provides quick reference to most *VisiCalc* features. You might use it as a refresher once you have begun to use *VisiCalc* in earnest.

The program comes with a slim guide that includes exercises to do with *VisiCalc* itself if you want to test yourself on the real thing. The guide also includes seven sample spreadsheets: Sales Reports, Stock Portfolio Analyses, Personal Net Worth Statements, Profit & Loss Statements, Cash Flow Forecasts, Pricing Models, and Performance Records. These samples come com-

plete with all the keystrokes needed to produce them, so if you want to, you can go straight to the spreadsheet you need and produce it without understanding much of *VisiCalc*.

In fact, *Cdex Training for VisiCalc* puts you and *VisiCalc* into business quickly, without your understanding any more than you want to about spreadsheets.

THE DOS TEACHER

AV Systems, Inc.
$29.95
48K; II+/IIe/IIc

Overall Rating	B-	C	*Reliability*
Ease of Use	B-	D	*Error Handling*
Documentation	C	B	*Value for Money*

If you've ever been interested in learning about how the disk works or how the computer keeps track of the information it holds, then this is the program for you. Most people can catalog a disk and save or delete a program, but not many know what DOS stands for. The Disk Operating System is the method the computer uses not only to load files, but also to work with them in many other ways. This program teaches you some of the options available and lets you glimpse hidden possibilities you may not have thought of before.

When you first boot up the disk, a menu of selections ranging from Mylar disk recording to Encryption appears. Each section has a smattering of information and data about different phases of DOS, with a test or two thrown in for good measure. Most of the lessons are designed for the average interested high school student, or a class in computer literacy, yet I still found things of interest and a few options I hadn't tried before. Included are a Disk Mapper, Discoscope (allowing you to read/write to a particular sector), Disk Space Routine, DOS Command Changer, a nice Bin./Txt. Converter program, and a DOS Command Locator.

The main drawback of this program is its really bad error trapping. More than once, an error message appears because I hit the wrong key. If I could do it that easily, imagine how frustrating it could be for a novice. But *The DOS Teacher* is still well worth the price, if you don't mind taking your time and typing carefully.

HELLO: APPLE II

AV Systems
$29.95
48K; II/II+/IIe/IIc

Overall Rating	D	C	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	B	F	*Value for Money*

This package attempts to teach new users about the capabilities of the Apple II series of computers. The disk is crammed with fifty-two programs stored in a compressed form. They are fully menu-driven and cover nine subject areas.

Section One is called Skills for Computing. It consists of several lectures on disk about the virtues of computing and BASIC. As educational tools, they suffer from the same shortcomings as classroom lectures. Personal Programming consists of several clever programs aimed at nutrition and weight-watching. The Checkbook Resolution program is not really very useful since it does not store any data. The Memory Improvement program is a simple program for learning combinations of letters. The Business Programming section contains eighteen financial programs which are useful, but also available in the public domain.

The Entertainment group has several trite and simple games, while Graphics Programming has four examples of that form. Programs in Science consists of three programs that teach simple science facts. They are nicely interactive and well designed. The section called Applications Programs should be named Miscellaneous. The Software Evaluation program is very nicely done. The Sound Effects program and the Mathematics programs are available in the public domain.

My main complaint with this package, as you may have guessed, is that most of these programs are available in the public domain. Although their programs can be listed, the compressed format makes them unintelligible, stripping the user of a potential learning tool. A new Apple II owner would be better advised to join a users' group where programs of this sort are easily obtained.

TALK-U-THRU: WORDSTAR

Talk-U-Thru Tutorial Systems
$49.95
64K; II/II+/IIe/IIc/III
Z80 and 80-column card; *WordStar* distribution disk

Overall Rating	B-	N/A	*Reliability*
Ease of Use	A	N/A	*Error Handling*
Documentation	C	C+	*Value for Money*

This learning system targets the new *WordStar* owner. It consists of three double-sided cassette tapes, a twenty-five page guide, and a disk containing *WordStar* compatible text files, plus detailed instructions for modifying *WordStar* for use with an Apple III. The booklet seems more a summary of basic CP/M and *WordStar* commands than an instruction booklet. You might find it easier to refer to the folded reference card provided with Micropro's *WordStar* documentation.

As its name implies, *Talk-U-Thru: WordStar* teaches by talking you through a number of procedures and exercises. You follow spoken directions on the audio tapes to perform word processing operations on files contained on the accompanying disk. The tutorial begins with an easily followed lesson on booting CP/M, backing up disks, and configuring the *WordStar* distribution disk. After teaching you the rudiments of COPY, PIP, STAT, and ERA by having you actually use them, the program quickly exposes you to the basics of *WordStar* itself. Lessons cover cursor moves, block moves, and formatting. The sequence reinforces skills acquired in previous lessons. Once you are comfortable with the basics of manipulating text, you get talked through such advanced maneuvers as building custom ruler lines, setting decimal tabs, file management techniques, and even converting Apple DOS text files to CP/M compatible files.

Talk-U-Thru: WordStar provides a fairly fast and effective introduction to both CP/M and *WordStar*. The curriculum, if diligently followed, takes roughly six two-hour sessions. Upon completion of the course, while still far from expert you can use *WordStar* productively. The program is well worth its retail price to someone who wants to learn quickly how to exploit the power of *WordStar* while avoiding the frustration and agony of poring over user's manuals. On the other hand, you can also find a number of other excellent training guides for *WordStar* from different publishers, equally easy to follow and well written, that sell for a fraction of the price.

GELFLING ADVENTURE

Sierra On-Line

This adventure game helps teach youngsters techniques for solving adventure games. It's a simplified version of the popular *Dark Crystal* game, in which children need only use the space bar and Return key to initiate actions. For a complete review of *Gelfling Adventure*, see the Graphics Adventures section of this book.

LOGO

M.I.T., Distributed by
Terrapin, Inc. and Krell Software, Inc.

Logo is a language designed for beginning computer users. It emphasizes graphics in teaching users about programming techniques. Please see the review of *Logo* in the Utilities section under Languages.

Computer Managed Instruction

General

BOOKWORM

J. L. Hammett Company
$99.00
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	C	C	*Value for Money*

Bookworm helps the small school library track book circulation, and prepare overdue book notices and lists. It consists of a program disk with backup and a copyable data disk. Six data fields record information about each book checked out: name, grade/homeroom, call number, title, author, and date due. You can sort the records by any one of the fields or combinations of borrower/date due or grade level-homeroom/date due. Minor inconveniences include a limited number of characters accepted by the data fields and date entry as "mmddyy" with no spaces. Printed reports include overdue notices for you to send to individual borrowers, and lists of overdue books, sortable by any of the fields. You must configure the printer to the program each time, a needless annoyance. Because operation is hidden, not appearing on the ordinary menu, you are protected from accidental, catastrophic purging of your data.

The documentation, although adequate, contains no tutorial nor any dummy data for practice. It also does not mention Hammett's warranty policy or provisions for product updates, but a company representative told me over the telephone that future updates are obtainable for $25.00 and proof of purchase. In fact, a revised version should be out by now.

The program delivers what it advertises, but most libraries should probably consider instead getting library management software or general purpose database management software which can handle their full range of informational needs, from cataloging to circulation, preparation of statistical reports and graphics, and even some word processing.

EQUIP: SCHOOL EQUIPMENT INVENTORY SYSTEM

Addison-Wesley Publishing Company
$195.00
48K; II

Overall Rating	A-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A-	B+	*Value for Money*

This school inventory system facilitates property management within the school system. Although designed with the assistance of school personnel specifically for schools, *Equip* could still prove useful for any business that must maintain an up-to-date property management profile. On the plus side, it requires very little computer knowledge and the documentation makes it easy to learn. The program also provides sample inventory forms and worksheets that any school system can modify for its own use.

Basically menu-driven, *Equip* requires only one disk drive and offers easy entry and exit. The menu of the main program disk provides the options of updating categories, printing reports, or exiting. The data disk menu provides for the establishment of equipment categories and entering, deleting, or revising entries. A continuous updating feature provides a sample form and allows updating of information. You can establish as many as thirty-nine categories under the two broad headings of "instructional or non-instructional materials." Each data disk accommodates as many as 999 line items per category, which makes this program suitable for both large and small schools. Larger schools may need additional data disks, but you can easily handle the problem by having instructional material disks and non-instructional material disks.

You can easily obtain printed reports from this database program. The retrieval method resembles that used by the PFS series. Reports are available by category, description, manufacturer/model, or location. The program documentation provides extensive pos-

sibilities for printing a variety of reports.

Although very well written, *Equip* is not without some problems. For example, it provides only enough room for an eight-digit serial number for any equipment. Since many items may have more than eight digits and some may repeat the same first eight digits, entries may require some modification. In addition, you only get fifteen characters for manufacturer/model entries. This means you must consistently enter items in the same manner or you may have trouble retrieving them. For instance, do you enter Bell and Howell in that manner or as B and H? This makes the human element very important to the program's success. You must exercise a great deal of care in data collection and validation procedures. Some schools may not want to commit the time or personnel necessary to take full advantage of *Equip*.

Despite these problems, if you use *Equip* properly and to the extent of its capacity, it provides a powerful tool for any school system, facilitating inventory control, reports, planning, and budgeting for new material. I recommend it to anyone who wants a better, more efficient inventory system.

MEDDLE PRUF

Microcomputer Workshops
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B	*Value for Money*

Meddle Pruf is a disk protection program, designed to be used in the classroom. It individually protects every student's disk with over 3,900 possible combinations, insuring incompatability between students' disks. Students may not read other students' disks or exchange programs among themselves. Thus, programs assigned for homework cannot be stolen or plagiarized. Each disk is also assigned a password to prevent unauthorized access and tampering.

This disk would be very useful in literacy or programming classes where students were working on individual programs. It could also be used in simulations, problem-solving activities, or competitive group activities where privacy of information is a factor. The program covers all conceivable classroom situations, including merging and back-up files. The documentation is helpful and prompts are given with instructions.

QUICK-SEARCH LIBRARIAN

Interactive Microware, Inc.
$75.00
48K; II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B-	B+	*Error Handling*
Documentation	B+	B	*Value for Money*

Quick-Search Librarian is a specialized database to help academicians manage either files of collected or copied journal articles or abstracts of articles located in library collections. It is not designed to serve as a reference program for comprehensive library collections, but it is quite adequate for most individual office collections. The singular advantage of the program is its ability to manage files which are otherwise often chaotic, bulky, and difficult to sort, search, and/or merge. *Quick-Search Librarian* is generally efficient and effective. It takes some getting used to, and will not always take the place of initial handwritten notes (in the case of managing personal abstracts of articles in a library collection), but should prove helpful for the scholar-teacher who takes the time to set up the program's categories and search keys.

The program can hold approximately 1000 articles (entries) on one disk. Each entry may be cross-referenced by assigning to it up to twelve of the 255 available keywords. You enter these keys as you organize each individual file. These keys make *Quick-Search Librarian* particularly efficient; only two keystrokes are required to assign keywords or journal titles from established lists, and each key or journal title uses only one byte of memory (preserving space for a surprising number of entries).

Entries may include up to four lines on the screen for information beyond the journal, volume, year, and page reference. Entries may be edited with considerable ease.

You can search the database using a variety of criteria (informational and logical), and search reports may be printed in any of several possible orders (alphabetical, chronological, topical, etc.). Search speed is approximately fifty articles per second.

Subset lists of articles may be established, retained, and eventually deleted as desired. Pairs of lists may be merged as well.

Readily available screen menus and lists of categories, keywords, and journal reference titles and keys help you maintain some consistency in entries. Also, because these pre-established keys are based on a single byte storage system, entries do not have to be typed in complete form; *Quick-Search Librarian* reads and displays fuller names than the user is required to enter

regularly.

The program disk is most efficiently used with a separate data disk and drive, but there is space for small files on backup program disks (which can be made with COPYA), and there seems to be little disadvantage to using the program with a single drive.

The instruction manual contains, in addition to descriptions of various program features, a brief tutorial to help familiarize you with the process of entering, editing, and arranging journal entries, as well as sorting, printing, and merging files drawn from a sample database. The manual is pretty good. As I made my way through it and the tutorial, however, I wished for suggestions of alternative applications for the entire program and tips for setting up lists of keywords.

Since the program appeared in 1982, update reports correct flaws in the original program. Interactive Microware does seem to be responsive to the user's need for a dependable system that will manage relatively large files. A typical update report offers to reconfigure the original program disk for a reasonable fee, but it also describes how you alter the disk yourself.

Use of the program is likely to be limited to academic scholars, teachers, and researchers. You'll have to struggle through an initial adaptation period, the most traumatic phase of which may be the establishment of effective categories and keywords which will be the heart of your system. Patience early on does, however, pay dividends later. The program is certainly worth the price if you fully customize it.

Gradebooks

APPLE GRADEBOOK

Compuware
$24.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B	A	*Value for Money*

This program updates the earlier *Apple Gradebook* by Glen Bever. It remains a good buy for the money even though it cannot categorize or weigh class grades. Two competing programs can, but they cost $15 to $30 more.

Apple Gradebook handles classes of up to thirty students—sixteen classes using a file disk and a two-drive system, or nine classes using the program disk and a one-drive system. If you have a one-drive system and want to keep files on more than nine classes, copy the program disk and keep extra files on the copy. Once you've entered information on the classes, you can add or delete names or scores and get printouts (from the printer or onscreen) of current statistics for individual students or for a class. The summary includes such information as the class mean and an alphabetical list or rank ordered list of students. The program automatically alphabetizes names and generally gives you enough onscreen prompts and second chances to help you avoid major mistakes. For instance, it reminds you at the beginning of each entry session how much class or grade storage you have left. It also reminds you of the maximum possible score if you enter a score in excess of the maximum, and gives you a chance to correct it (or any score).

Like most other programs, this one won't tolerate giving two classes the same name. If you do so, you'll lose the original file (a good reason to make a backup). You can overcome the inability to categorize (for example, quiz, test, or assignment) or weigh grades by mathematical means or by setting up a separate class file for each category.

Both onscreen and printed instructions are adequate, although the documentation makes one claim that I couldn't carry out—using a line shifting command to correct student names when entering a new class. However, you can go back to change the name after entering the roster. Users of the old version of *Apple Gradebook* should note that they can transfer already established files to this program.

ASSISTANT TEACHER

Overdrive Computer Corporation
$150.00
48K; II+/IIe/IIc/Franklin
80-column card recommended
Optical scanner optional

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	A-	*Value for Money*

Assistant Teacher, intended for teachers at all levels of computer competence, provides several programs useful at any level of instruction. Two disks and a thorough, well-written manual enable you to: create a class list; establish marking periods and grading structures; create, edit, and change the order of test questions and answers; print exams out on a printer or administer tests on the computer; grade examinations (which you can also do in association with a Scan-Tron optical mark scanner); curve class grades; analyze student responses to questions; monitor the progress of individual students; and create and print documents using the word processor included in the package.

The system can accommodate 255 students and up to 255 grades per course. Each test can consist of up to 242 questions with as many as twelve possible choices for each answer. You must enter essay question scores manually. You may give exams different "weights" when deciding the student's average (a midterm exam can be worth more than a quiz, for example), and even enter exemptions. You can move from one mode to

another within the program quite simply and correct your errors easily. You can modify the program, written in Applesoft BASIC (90%) and Assembly language, for your own convenience. You can also copy the two program disks for backup purposes—very important if you have licensed the system for a school.

Screen directions are clear and complete, but to take full advantage of the programs, you should read the documentation thoroughly. It provides a tutorial for each function, along with a summary of commands. The documentation also explains how to manage the files created with the program using FID and outlines "security considerations." The program runs smoothly on both the Apple II+ and IIe with Apple dot matrix printers, but you may need some assistance to use it with other types of machines.

The program includes four report formats and allows you to create your own. It also includes the word processing program necessary to compose tests, which you can use separately. On computers lacking lowercase capability, the Control-A command displays the letters in inverse mode on the screen and then prints them in lowercase. Although the word-search function could not find words completely in the inverse "lowercase," the word processing program is simple and generally good at what it does.

Assistant Teacher provides teachers with the enhanced ability to create courses and monitor student progress in a straightforward, easily-used way. It eases the load of administrative tasks that each teacher faces and could greatly increase the amount of time spent teaching.

THE CLASS MANAGER II

Merlan Scientific
$95.00
48K; II/II+/IIe

Overall Rating	C+	B	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	B	C	*Value for Money*

Class Manager II is an update of a program that helps a teacher keep track of student progress for an entire year. Each file accomodates up to thirty-six students and twenty-five raw scores per student. Hard copy can be generated for individual or class averages with statistical information showing the median, standard deviation, and the distribution of grades. The program also ranks the students' averages, from the highest to the lowest. At the end of each semester, a final grade is calculated for each student and a new set of grades can be started.

This program is menu driven and simple to operate. If you make a mistake, Return sends you back to the menu. However, if you enter more than thirty-six students in a file, an error number message is generated with no explanation. Once a class file is created, names may be added or deleted, and grade weights may be changed.

You can use the grading categories that *Class Manager* provides (labs, texts, class participation, and exams) or you can invent up to ten other categories (four to five are generally easier to handle), and determine the weight of each category in deciding the final grade. Student names can be up to twenty-four letters long and contain an identification number or a code for homeroom, etc. You enter raw scores using a two-letter code which indicates whether these scores are for the first test, final exam, and so on. Sorting by last name and calculating averages is automatic.

This is a fairly decent program for teachers with small classes who grade by averages. It suffers by being too limited; other class management systems, for instance, include test generators. Although the program is generally easy to use, you're bound to run into a few problems. When printing out the lists of averages, for example, the screen sometimes tells you it is calculating and other times just goes blank. The printer stops to wait for the calculation, giving the impression that something has gone wrong when actually there is much more to print. You are also restricted to storing files on the program disk since there's no capability for using a second disk drive. On the good side, *The Class Manager II* is greatly improved from the original version. Access to the programming instructions is available so that modifications may be possible.

CLASSMATE

Davidson & Associates
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A	*Value for Money*

Classmate helps teachers manage their class records. It stores students' names, attendance records, and grades. It sorts the names in alphabetical order, prints class rosters, computes grade point averages, and analyzes grade distribution.

Classmate presents easily understood menus and proceeds so logically that I could perform the entire routine without looking at the documentation. First you enter the names of your students, which the program sorts alphabetically at your request. You can also include an identifying code number. You can add or delete a student's name, or change the information before entering grades or attendance. The program accepts number or letter grades. You can also specify an excused or unexcused absence. The program computes the grade point average accordingly. You can enter up to thirty marks for each student, plus titles to describe the assignments or tests. Attendance follows much the same general format; you can divide the period into semesters, quarters, or months. You can also enter comments about each student's progress. The program provides shorthand "codes" to save space, or you can devise your own brief ways to store information. You have up to 239 characters per student, but the manual warns you that if you use the maximum space for each student in a large class, you may run out of memory.

After entering the information, you can view it on the screen or printed out, either for a single student or for all of them. You can also view the overall class performance on all tests or on just one. The system computes and displays weighted averages, giving each assignment or test the value you wish. You can adjust the numerical values for letter grades if you wish. The program will rank the students, or give you a distribution curve for the whole class. *Classmate* really shines here—you can see a single student's average or the state of the entire class at any point without going through the manual computations. You store the information about each class on a separate data disk, so you can keep records for any number of classes. You can also get a printout of missing work to schedule make-up sessions.

The program comes in a neat little three-ring binder with space for additional data disks. The adequate documentation includes clear instructions, a reference guide, and examples of printed reports. The program disk is copy-protected, but it carries a one-year warranty and the company provides backups, sensibly priced at $10.

I found no errors in the program, although occasionally I had to proceed through an entire portion rather than quitting. Also, each time you boot the program, you must reconfigure it rather than writing it onto the disk the first time. Nonetheless, I thought the program very modestly priced. It runs on a simple hardware configuration commonly found in schools and is easy to use even if you use it infrequently. It offers good value for the money.

GRADE AAA GRADE BOOK

The Soft Warehouse
$65.00
48K; II+/IIe

Overall Rating	C+	A	*Reliability*
Ease of Use	C+	C-	*Error Handling*
Documentation	B-	C	*Value for Money*

Grade AAA Grade Book helps teachers keep track of grades and assign letter grades to numerical or percentage scores. You store class records on separate data disks, each of which holds records for several classes with limits that accommodate large classes with relatively few scores (155 students with 9 possible scores per student) or small classes with more scores (30 students with 53 possible scores per student). This menu-driven program allows the addition or deletion of class files and score or name columns. It lets you change scores, view files, and create blank grade sheets. You can weight each column of scores any way that you wish and calculate total scores, percentages, and the appropriate letter grade using this weighting. To assign letter grades, you set the lower limits for each. The program also analyzes each column of scores to find the average raw score, high and low score, and average deviation, plus an overall average percentage. The program then prints a comparison of actual class results to an "ideal" letter grade distribution (10% A, 30% B, 45% C, 13% D, 2% F). It also prints a scale of percentages, making it easy to visualize the position of individual scores within each letter grade. This lets you use your own discretion when grades fall close together near a cutoff point.

Simple but adequate, this program has few drawbacks. Two are the limit of ten characters per student name, and the necessity of typing in the entire class

description (class name, teacher, year) to call up a file. If you fail to type in all the necessary information, the program throws you out and you must start over. Although the price seems high for a program within the capabilities of an intermediate BASIC programmer, *Grade AAA Grade Book* performs tasks not likely to change or need improvement.

GRADEBOOK

EduSoft
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A	*Value for Money*

I doubt anything will ever take the place of the old-fashioned, hand-written teacher's gradebook, but for teachers who want to computerize their gradebooks, this program probably comes as close to what you want as any you can find. You'll find it particularly appealing if you average a lot of homework assignments, quizzes, and tests to obtain grades. EduSoft offers a very reasonable school-wide license for only $35, permitting you to make a copy of the program for every computer at the school and including five extra instruction books.

Gradebook handles up to 190 items per student for up to forty students in five classes on each data disk. The class name becomes a file. The program alphabetizes students names after you enter them. You can enter grades for tests, quizzes, and homework for four quarters, plus a final exam. Alternately, you can use a three level hierarchy with three reporting periods during two semesters. You can revise or delete any item practically at will. These factors demonstrate to a small degree the flexibility of this program.

The program accepts three kinds of grades: percent (0-100%), letter grades (A-F), or points (0-200). The author, Scott Steketee, solved the problem of averaging by assigning values to the letter grades and storing all grades as numerical values. Thus, you can arrive at an average of all grades regardless of the original type. In addition, you can "curve" the grades by setting a curved value for the raw score or letter grade.

The options for averaging should satisfy the most particular teacher. To obtain each student's grade, the program normally averages grades in the following manner: first quarter test average, first quarter quiz average, first quarter homework average, and first quarter total average, then the same process for the second and following quarters. You can assign relative weights (0-100) to each average calculated. Students will rejoice—you can drop low marks from any of the categories. For example, you can count only the best eight of ten quizzes, or the highest three homework assignments of the four given. Finally, you can curve the averages in the same way that you did the grades. The program calculates the mean and standard deviation automatically.

Gradebook offers four major reports on the grades and averages:

- Simple Teacher Report tells you the students' names plus their grades for any chosen assignment.
- Detailed Teacher Report includes the information in the first report plus each grade's weight, the maximum number of points in the assignment, the mean and standard deviation, and so forth.
- Student Summary Strips are narrow strips, one inch high, which you can cut apart to give to the individual students.
- Detailed Student Reports are full page reports that you can give to individual students or their parents.

The above features by no means describes the full extent of this relatively foolproof program, *Gradebook* offers many options without becoming unduly complex. The program framework includes disk initialization and a copy program and the package comes with excellent documentation. It's without a doubt a sound and reliable gradebook program.

REPORT CARD

Sensible Software, Inc.
$59.95
48K; II+/IIe/IIc; II with Applesoft card

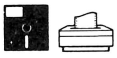
Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A-	*Value for Money*

Report Card enables a teacher to compile course information including class rosters, student identification numbers, and activity grades. The system depends on a hierarchical structure of menus. You access specific tasks by moving through the various levels of the structure. The combination of hierarchical design, liberal use of prompts, and lucid documentation render the system usable even by the computer novice. Most important, you can access and implement all procedures without memorizing a single command.

Numerous features impart strength and flexibility to

Report Card. For example, the program assigns relative weighting factors rather than percentages to each class activity. Simply put, this means that an activity with a weight factor of thirty has twice the effect on a course grade than one with a weight factor of fifteen, regardless of the maximum score possible for each. This powerful technique greatly simplifies exam construction and the tabulation of grades. Another important feature lets you alter and update course data and weighting factors at any time. In addition, you can calculate averages at the completion of each activity, monitoring a student's progress and class ranking throughout the school term. You can obtain hard copies of class data easily with most printers. If your printer does not respond to the command PR#1, the program contains an option to modify the printer control codes.

Despite my obvious satisfaction with *Report Card*, I would like to note a few shortcomings. Although you can store data for up to twelve classes on a disk, class size cannot exceed forty students. Also, although you can generate a listing of all activity scores for an entire class on the printer, you cannot do so on a monitor. Furthermore, you may have trouble reading some of the tables because of the absence of spaces between rows and of connective lines between columns. Finally, the program does not calculate a standard deviation, making it difficult to assess and compare averages between classes. However, these minor criticisms do not detract significantly from the quality of the program.



TEACHERS' MANAGEMENT PROGRAM

Regents/ALA Publishing Company
$95.00
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	B	B+	*Value for Money*

Teachers' Management Program is a record keeping program designed to keep track of an individual student's performance on either *Grammar Mastery* or *Vocabulary Mastery* (see reviews elsewhere in this book). Without this program, the other courses serve only as practice because once you turn off the computer, you lose all record of your performance. *Teachers' Management Program* records scores on a Personal Start-up Disk or a Teacher's Start-up Disk.

The program consists of two disks (a program disk and a personal start-up disk) and a brief, readable handbook. The Main Menu gives options for preparing students' disks, preparing reports of student scores, changing scores, changing students' or teachers' names, or changing custom features. To prepare a personal start-up disk, you record the student's name, the teacher's name, the course name, and specify whether students work through the exercises in sequential order or any order, whether to leave sound effects on or turn them off, and whether students can work regular or game exercises. From that point on, students can use *Grammar Mastery* or *Vocabulary Mastery* with their own disk instead of a general start-up disk. After a session at the computer, students remove the course disk, insert their own disk, and have their scores permanently recorded on it. Teachers can read each student's personal disk to see the scores, but it's simpler to record them on a teacher's personal disk, which holds up to fifty student scores.

One of the program's best features is its ability to tally and print out student performance. The program can compute a variety of reports from either the teacher's or student's personal disk: a Summary Report, which gives the overall percentage of each student in a course; a Detailed Report, which gives an average percentage and percentages for each exercise; or a Diagnostic Report, probably the most useful, which gives the exercises on which students scored poorly (as defined by the teacher).

Overall, I found *Teachers' Management Program* a fine record keeping system with lots of small, carefully thought out features. For example, each student can put a password on his personal disk, which prevents other students from reading his or her scores. The Teacher's Code lets the teacher circumvent all passwords. You can also recover the scores of the last person to use a lesson disk, which helps in case he or she forgot to record the scores for that session. However, a couple of caveats are in order. Preparing start-up disks for each student takes time. Moreover, students need maturity or knowledge to juggle disks. Although the screen displays careful instructions, that's quite a bit to ask of students just learning English.

Authoring Systems

THE BIOLOGY TEST MAKER

J & S Software
$75.00
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	C	B	*Value for Money*

Biology teachers take note: *The Biology Test Maker* can help you save time and prepare better tests. The program consists of four copy-protected disks (no backups provided), each containing a test-generating program and two data files. Data files contain a total of approximately nine hundred questions on animals and plants, biochemistry, diversity, ecology, genetics, living things, physiology, and reproduction. You can pull test questions from these files and add your own questions to suit the tests to different classes. You can then save these customized tests on separate data disks under normal DOS 3.3. You can even use the test generator program to create entirely new sets of test questions for a variety of subjects. The program then prints tests (if you have an Epson printer, you can use emphasized print) and answer keys.

This menu-driven program is constructed to prevent you from making irretrievable errors. Be careful when deleting files; one false step could wipe out a lot of work. I suggest locking files that contain only questions you generated; but watch out, because the locked files can make the program do funny things until you unlock them. Other "friendly" features include a reminder to Apple IIe owners to keep the Caps Lock depressed, a message about the time needed to print a test (which can be considerable; a fifty item test can take fifteen minutes), the capacity to escape or return to a menu from many different parts of the program, and a feature which allows you to initialize a data disk without exiting the program—a lifesaver when you discover you don't have a formatted disk.

The program does not lack shortcomings. It will hang if the printer is off when you try to print a file. The questions are all multiple choice. Editing commands used to create your own test questions are awkward. In defiance of conventional testing formats, answer blanks appear on the right side of the test and responses are limited to numbers one through four rather than the letters A through D. Furthermore, the documentation does not give any information about the validity or reliability of the test items or if they correlate with any textbooks.

CREATE-A-TEST

Cross Educational Software
$89.95
48K; II/II+/IIe

Overall Rating	B	B+	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	B-	B	*Value for Money*

The basic component of a series of test construction aids produced by Cross Educational Software, *Create-A-Test* provides the means for assembling tests of various lengths (up to 100 questions) and types from master files of available questions, allows for some variation in formatting of tests, and offers the possibility of retaining test forms for later use in either identical or edited form. *Create-A-Test* fails to perform some notable functions, but its merits make it a worthwhile investment for an individual teacher, academic department, or school, especially in terms of the savings in secretarial time and frustration.

The program consists of a program disk, backup disk, sample questions disk, sample file disk, blank disk for formatting as a question disk, and a printed manual, all in a notebook binder. Simply put, the system draws on banks of questions which you type onto the formatted disks, invites the selection of questions and format-

ting of those questions for a particular test, and provides the means to print out the test form (and save it, if desired, for later use). If there is a catch, it involves the dependence of test quality upon quality of the entered questions. You need well-designed, thought-provoking questions to create a good test. You can either type your own questions into the program, or call upon files available from Cross. The company markets several question files and invites the submission of more by users of the system; at present, though, the files are limited to the physical sciences.

I encountered no particular problems with the easily used program disk. The menu allows for assembly of a test; access to disk files of previous tests; a choice of printing options, including printing single questions or complete tests and altering the format of a test; and access to an editing program to enter, edit, delete, or display questions, or dump them to the printer.

The procedure required to enter questions onto disk files and to edit questions already there is a little troublesome. A formatted disk contains 450 units of six 40-space lines each. This is sufficient for most fill-in-the-blank or true-false questions, but insufficient for many multiple-choice questions. You can extend a question beyond the six line unit to another unit and type in answers so that they print out onto a master question list, but not onto the formatted test. Because the program is written for the Apple II, it cannot take advantage of some IIe features (such as directional keys and the Delete key) which make other forms of word processing handy. I found the Control key commands in the editing mode a little cumbersome, but since the commands appear at the bottom of the screen during editing, you lose a little time searching for the correct entry even while learning to use the program.

A novice should expect to spend an hour or two of learning time before feeling really comfortable with the system. You are urged to, and will want to, maintain an updated printed copy of master question files because this list allows you to quickly identify questions you can include on a given test.

THE EUREKA LEARNING SYSTEM

Eiconics
$300.00
64K; II+/IIe

Overall Rating	C	B	*Reliability*
Ease of Use	C-	B+	*Error Handling*
Documentation	B-	C	*Value for Money*

The Eureka Learning System from Eiconics allows an educator with no programming experience to design lessons, tutorials, and quizzes for use on the computer. It comes with a system disk, a demonstration disk, and a book of instructions containing detailed tutorials. The demonstration disk contains the same three lessons created when using the tutorials. It is strongly suggested that you read the tutorials (sixty-four pages) carefully if you want to properly use the system. One major problem with the tutorials is that while the authors show the methods of entering information and manipulating the program, they do not fully explain them. The program also asks you to accept information that makes more sense when you have read all of the tutorials—not an example of good teaching.

Entry of information formed into lessons or quizzes is a lengthy and complicated process, never directly explained. From the entries you can form whole sentences, questions, and multiple choice quizzes using several formats, including combination text and graphic answers. After entering information, all facts display for review and correction. You can present student options (creating timed units and controlling sound and order of presentation) and edit the text.

Character and shape editing procedures are provided, although difficult to use at times. The tutorials help, as does the index of the manual and the sample lessons in the manual. Although the authors encourage you to follow chart format, the charts provided are already filled so that you must make up your own.

You purchase a license to use the system. This entitles you to create lessons. If you wish to use these lessons as a major part of instruction and distribute or sell them, you must sign another agreement and pay a duplication fee or royalty to Eiconics.

The system could be useful to a teacher who is certain they don't want to learn a programming language, but the basic cost plus the additional charges are high when a good course in one of the easier programming languages would, for the same price (or less), accomplish the same goal while providing additional knowledge.

INDIVIDUAL STUDY CENTER

Teach Yourself by Computer Software
$59.95 (without set of questions)
$79.95 (with set of questions)
48K; II/II+/IIe

Overall Rating	D	C	*Reliability*
Ease of Use	C-	C	*Error Handling*
Documentation	C-	D	*Value for Money*

Individual Study Center provides six separate "gaming" strategies for studying and retaining information. A teacher can develop question banks with a maintenance program to customize the questions and answers to suit the class. For an additional $20.00, a set of questions is available for the package. Unfortunately, the package is dated and not representative of state of the art software presently available for schools. The program lacks the on-screen assistance that I have come to expect in educational software and doesn't tell you that you cannot exit subprograms without a Control-Reset. The subprograms run slowly and contain limited appeal for children accustomed to being entertained by arcade games and impressive adventure software.

House on Fire, Around the Ball Park, and Beat the Clock provide game activities, while Completion and Matching provide workbook style drill and practice without visual appeal. Unlike recently developed software, this program's error messages employ a lot of jargon. In fact, the package isn't worth the effort it takes to develop data files for specific subject areas tailored for the different grade levels. What teachers presently do to practice and reinforce learning far surpasses the use of this software. I do not feel that *Individual Study Center* enhances learning and thus I do not recommend that you buy it.

LUCKY'S MAGIC HAT

Advanced Ideas, Inc.
$39.95
48K; IIe

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	A+	*Value for Money*

This is another "new generation" educational program from Advanced Ideas, offering expandability and authoring for a modest price. Like *The Game Show* or *Master Match*, *Lucky's Magic Hat* features a master program with authoring capabilities and sample lessons. Four optional programs on early learning skills, language skills, foreign languages, and SAT preparation for use with the master program are also available (priced at $19.95 each).

Written by Lee Anne Horton, the master program uses a sprightly leprechaun who appears and disappears with a nice (optional) "whisk." From his hat come questions; when a question is answered correctly, a rainbow of colors and a coin reward the player. After three correct responses, Lucky will dance a lively jig, as well. A wrong answer prompts a replay of the original clue and the correct answer. No penalty sounds alert classmates that the player has made an error—an excellent touch that avoids the pitfalls of negative reinforcement. At the end of the game, the player (or two players) sees a scrolling display showing the number of coins in his gold pot, with a reassuring "_____ wins!" (The program inserts the high-scorer's name.) This is an extremely well-conceived, colorful, and easy-to-use framework for the various subject areas. If a child can load a disk and read, he will find enough screen prompts to play through the lessons without needing the manual or even the "start-up" card.

A sampling of tutorial-quizzes from the four optional programs shows the versatility of the master program. A number of them involve graphics and problem solving, such as Pathfinder for early elementary students, or pictures coupled with appropriate identification, such as the "Foods" area from the Foreign Language program, or "The Senses" from the SAT preparatory program. Within a game, one can expect some variety, too. Parts of Speech/Riddles (from the Language Skills program) asks identification, multiple-choice, and fill-in-the-blank questions, often in the form of silly riddles, testing both the student's memorization of a passage and his ability to identify a part of speech. Obviously, the authors sought to make the tutorials inherently interesting, even though they already were one step ahead with Lucky, their energetic master of ceremonies.

A tutorial framework and seventeen separate subject areas (mostly language arts) appropriate for ages five to adult, would normally represent adequate value for the money. However, the ability to author quizzes in new subject areas makes this educational software a truly outstanding value. Using a separate graphics tool or the basic on-board graphics program (six colors, two shapes, line and point plotting), plus writing, formatting, and editing capabilities, you can generate your own games in any subject area or alter existing ones. The basic game format includes instructions, a display scroll to study (within a set time or until the player presses Return), up to five questions about the display, and the possibility of repeating the display in the event

of an incorrect answer. The documentation assumes no prior authoring experience on your part. It steps you through the stages so gradually and carefully that I suspect many parents or teachers who like the "Lucky approach" will be inspired to create new lessons.

My compliments to the folks at Advanced Ideas for creating one of the most versatile educational tools I've ever used and reviewed!

MATHEMATICS WORKSHEET GENERATOR

Sterling Swift Publishing Co.
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	B+	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B+	A	*Value for Money*

Busy teachers will find *Mathematics Worksheet Generator* a real boon. In just a few minutes, you can create and print a page of elementary arithmetic problems complete with answer key. You can view the problems and answers on a monitor and save them to disk before printing them out. The program supports at least seven printers including the Epson, Apple, and Panasonic.

First you determine the number of problems, their type (addition, subtraction, multiplication, or division) and the number of digits to be used (one to six). If your students haven't learned to carry-over yet, you can limit the maximum value of each digit. Conversely, if that is exactly what you want them to practice, you can raise the minimum. You can also ask for extra zeros in subtraction problems. In both multiplication and division problems, the multiplier or divisor must be less than the multiplicand or dividend. Finally, you may request a remainder or no remainder for the division problems.

You can determine the layout of the finished worksheet or test to a certain extent. Headings may include the teacher's name, type of problems to be worked on, date due, etc., or use no heading at all. Problems may be mixed on one sheet and you can choose the size and darkness of the print. The answer key can be printed in a random order at the bottom or on a separate sheet.

Although there is no customer support number to call, Sterling Swift provides an unconditional guarantee against defects or disk malfunction. After ninety days, damaged disks will be replaced for a $9.95 fee. For school accounts, they offer substantial discounts on subsequent purchases of the same software.

MICROTUTOR

Locus Systems
$29.95
48K; II+/IIe/III in emulation mode

Overall Rating	C-	B	*Reliability*
Ease of Use	C+	B	*Error Handling*
Documentation	C	C+	*Value for Money*

Microtutor, a program for educators, allows you to write question and answer quizzes, multiple choice tests, simple graphs, and other educational or informational texts. The producers developed the program for the Apple II+ and Apple IIe and recommend using a dual disk drive to create text files. Unfortunately, the program represents an authoring language limited in scope and outdated with respect to the others available. It does possess some laudable features, nonetheless. It is menu-driven and easy to use because it has created a text file which functions as a tutorial. The program divides into two sub-programs, a microtutor program to develop instructional text files and a microscholar program for testing or teaching. The former uses instruction commands to formulate lessons which you can then develop, use, and edit for another student or class if desired. This sub-program has many of the editing features of a word processing program (change, erase, find, insert, and so on) and options to print out the file with various specifications on how, and how much, you want to print. A note of warning: a new computer user would find the word processing features difficult to interpret from the manual. You could also question why you should use this program rather than using text files from a word processing program inserted into core programs.

The graphics capabilities are also limited, a real drawback in developing classroom instructional materials. A fifteen-page booklet supplements the weak documentation. Of course, the program does not claim to do more than develop text files for quizzes and instructional materials. Educators should look around for a more versatile authoring program that allows for development of creative instructional materials.

QUIZIT

Regents Publishing Co.
$39.95
48K; II/II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Bill Wadlinger's *Quizit* accurately advertises itself as a "teacherfriendly educational word game." It is an outstanding value for the teacher who wants to produce fill-in-the-blank quizzes for his students without having to master a complex authoring system to do it.

The typical exercise involves guessing a word that completes a sentence. The student views the incomplete sentence (including the blanks), is told how many letters are in the correct word, and is prompted for the number of letters he'd like to choose. The teacher has the option of including a hint of up to eighty characters, accessed by the Escape key. Using the hint, or any clue letters, affects the number of points awarded for a correct answer and the overall score. The student is allowed two opportunities to guess the word, and the first incorrect guess is not penalized.

From the student's perspective, *Quizit* may seem to be a game, not a test. Two students can play at one time, but not in competition with each other. Rather, they are meant to assist each other in solving the puzzles. To further that optimistic goal, experienced teachers or parents may want to add certain limits, based upon students' ages or personalities.

Each student is addressed by his name or nickname to keep proper track of whose turn it is. Each question is displayed on a separate screen, starting with the incomplete sentence. The screen is laid out logically, with an address to the player, information on letters, an offer of clue letters, and the sentence in question displayed in the upper portion of the screen (the offer of a hint and the score are at the bottom). Correct or incorrect answers elicit a sentence of praise or encouragement. Two wrong answers elicit the somewhat compensatory message that the player has received no points but has "learned a new word."

At the end of a given exercise, a final score is shown along with the option to print out the quiz. Brief (optional) sound effects accompany each answer and the final score. Students scoring ninety percent or above are rewarded with a melody. Students can choose to replay a game exercise or go on to another one listed in the main menu. Once a student enters a game, though, he cannot exit except by rebooting the disk.

Although *Quizit* seems best suited for applications in an English, English as a second language, or a foreign language class, it has the potential to be useful for any subject. The only requirement is that sentences or strings pertaining to the particular topic be no more than eighty characters in length (counting the blanks), and that answers be twenty characters or less. The prospective responses may be words, dates (in history), numbers (math), or formulaic items (computer programming, science, math).

The program disk has the capacity for sixteen games, each with a limit of twenty-five questions. The teacher can control the number of games available for a given student or class. A utility program enables the teacher to transfer less-used games to a storage disk. The storage disk, however, cannot be used independently of the game program disk, which is copy-protected.

Documentation and onscreen aids make creating and editing exercises a snap. The mini-word processor featured in the editing program has a few logical Control commands. Most teachers or parents will start to create exercises within a half hour's time.

Regents supplies a phone number for technical assistance, and a sixty-day warranty. After that, a replacement disk costs thirty-five dollars. I had to return my first disk, which would not boot, and received a replacement quickly afterward.

SOVE TEST WRITER
SOVE TESTER

South Oregon Video Enterprises, Inc.
$99.95; $39.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B	A-	*Value for Money*

Created by a biology teacher for teachers, these two programs constitute one of the most versatile test formatters for the money. Chris Skrepetos has managed an accessible, menu-driven test writer which creates multiple-choice or single-question test files that can be selected for printing or, with the *SOVE Tester*, be used for onscreen self-testing.

The *Test Writer* allows up to 250 questions per file and up to eight files per data disk. A warning is issued when a data disk is ninety-five percent full. Each formatted single or multiple-choice question must fall within a 400-letter length. The questions are written across eighty columns and allow use of upper- and lowercase letters with punctuation. Multiple-choice questions are formatted for five choices; although you don't need to type in five choices, letters "A" through "E" are printed. Single questions are formatted without answer choices, which allows you to create true-false,

fill-in-the-blank, or even essay questions. Depending on the length of the questions and the length of the (optional) instructions to head up a section, the *Test Writer* prints up to thirteen single or six multiple-choice questions per page. It also prints an answer key.

Of special note are the selection and randomizing features. Before printing or allowing a student to review questions on-screen (using *The Tester*) you can select the questions to be used and/or begin the questions at a certain point in the file. When they are printed, the *Test Writer* numbers the questions and the pages sequentially. A minor shortcoming here is that one cannot simply designate which questions, by number, should be printed for a given test. You have to go through the questions one by one to select them for printing or choose them all. Hence, you won't want to fill the files to the maximum of 250 questions. On the other hand, the data disk retains the select status of questions until they are changed.

The *Test Writer* can be instructed to randomize the answers of multiple-choice questions, so a teacher can easily produce two or more versions of a test. Choice "E" always remains in the same place for those who want to have an "All" or "None of the above" option. Obviously, randomizing eliminates the possibility (as I found out in the middle of an exam) of the "multiple-choice choice," such as "Both B and C." One can also change the order of questions from printing to printing by beginning the test at different points in the file.

The *SOVE Tester* is intended for student tutorial use. With the *Tester* program disk and a data disk, the student can choose to be quizzed on all, or a portion (twenty to thirty percent), of the questions selected by the teacher (using *Test Writer*) from a given file. Viewing the questions in either a forty- or eighty-column mode, the student chooses or types in the answer and is immediately shown whether the answer is correct. If it is not, the correct answer is given. At the end of the quiz, a total of correct answers and a score are shown, but not written on the disk. Therefore, it could not be used to test a student's grasp of the material, unless someone hand-recorded the screen tally.

The key question for many teachers will be, "How easy is the *Test Writer* to use?" It is quite easy, especially when compared to other authoring programs with similar features. The documentation is logical and clear; a one-page "Quick Reference" guide will suffice to get you started. Moreover, the menu screens and onscreen prompts lead you through the options without much need of documentation. My student assistant, who is minimally computer literate, was creating questions files after only a couple of minutes of orientation.

A primitive, and therefore easy, editor can be used within a given segment of a question in the Write Question option or with any segment of a question in Review/Edit Questions. It would have been nice if the Write Question option had incorporated a confirmation ("Save to disk?") at the end of each question, so you could repair obvious botches immediately, but (knowing how exams are often made out) forcing you through an extra review-editing process will probably improve the mechanics of the exam. I don't mind the extra time required to build a bank of questions that can be used and reused. Finally, I had no problems getting hardcopy from C. Itoh and Okidata printers.

SOVE offers a thirty-day replacement warranty; afterwards a $13.00 replacement fee (including handling and mailing) is charged. In addition, institutions can enter into a multiple-copy agreement at a fee set by the student head count of the institution. For example, a university of 5,000 or more can receive ten copies of the *Test Writer* for $499.95. It can then purchase additional copies, with documentation, for only $10.00 per disk. Whether you pay the single-user price, or buy as an institution, the SOVE test programs are outstanding values.

SUPER QUIZ II (revised)

Sterling Swift Publishing Co.
$59.95
48K; II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	B+	*Value for Money*

An educational tool for teachers and administrators, *Super Quiz II* reduces the work involved in generating tests. It also allows you to create a test bank of up to ten thousand questions and perform all the functions necessary to edit, add to, and replace the questions. You also have a great deal of flexibility in choosing questions for a test, ranging from selection of specific questions to random selection. You can write in directions for the test in the limited space provided, then print out a hard copy of the test and the answer key.

The mechanics of operation do *not* achieve the simplicity claimed by the documentation. When I gave the program to a novice computer user, it soon became clear that I needed to stay there and help with the program. We worked through it together to develop a quiz for mathematics. Printing the quiz presented its own problem: how to set a specific format. I'd like to see on the screen how the page will look when printed.

Teachers at the junior high school, high school, and college levels would benefit most from this program because of the large numbers of students they usually

test. The large bank of test questions meets this need admirably. Regardless of the level of students for whom you wish to develop quizzes, you need to remember that the hours spent in developing a large question bank will pay off in subsequent years of teaching. One note: the small size of the print makes the package less useful for children in the primary grades.

The program comes in a small, loose-leaf binder, which makes it easy to store and retrieve. Dr. George Mason of the University of Georgia Education Department suggested an interesting use of the program. He reported that some teachers used the program for children to develop questions upon completion of a unit of study, as a study quide for both the question writers and other students who took these quizzes. This certainly seems an appropriate and valuable use of the program.

WORKSHEET WIZARD

Edu-Soft
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Tired of monitoring your class during math tests? Do your kids share their answers on their dittoed worksheets? This program creates totally individualized printed math worksheets (or tests) for every kid in your class, at prescribed levels of difficulty, for any of the arithmetical operations. It also gives you an answer key for each student by name and files the names, type of sheet, and levels alphabetically. Of course, you still have to correct the sheets by hand. The disk holds records for up to ten classes of forty students each. The simple file maintenance procedures allow you to add, delete, or modify student records at will. This straightforward program is simple to use, menu-driven, and comes with excellent documentation.

Worksheet Wizard covers addition, subtraction, multiplication, and division, plus measurements. The measurement option prints a list of lengths for students to draw in either inches or millimeters. Individual pages have from fifteen to twenty-five problems, depending on the space requirements of the format. Each area lets you select one of nine levels of difficulty. You can include one original line of instructions in the heading, plus a due date if desired. Because the program is a worksheet generator at heart, each page consists of problems of one type—no mixed operations.

One note of warning: This program uses reams of paper because it not only creates the worksheets, it also creates a second page for each answer key. You could feed a ditto master into your printer and make a single worksheet for the whole class, but the program's real value lies in the degree of individualization that it makes possible.

In keeping with Edu-Soft's sensible policy, you can make one backup copy of *Worksheet Wizard* or buy a school license for only $35 so that each teacher can have a copy. The company will replace defective disks free for ninety days or for $5 after that.

Computer Science

CREATURE CREATOR

Designware
$29.95
48K; II+/IIe/IIc

Overall Rating	B	Easy	*Challenge*
Creativity	B+	B	*Graphics*
Documentation	B-	B	*Value for Money*

Grades: K-4

This educational game, designed for children ages four to eight, provides a gentle introduction to the computer, impressing upon them that they can control the computer rather than getting intimidated by it. The program does this by allowing them to create their very own space monster from a selection of head, body, arm, and leg parts. A child as young as four can master the creative process, since it only requires two keystrokes. A make window shows a body part highlighted, while the creature in its present configuration appears on the right. Each time the child presses the Return key, the highlighted body part changes on the monster. When they have made up their minds, they can select a different body part by pressing the space bar. Eleven different heads and eight different arms, bodies, and legs make for thousands of possible monsters. Some look cute, others horrible, but none are menacing or scary to a three or four year old.

Creature Creator also attempts to teach the concept of programming in one of the most imaginative yet subtlest approaches I have seen. The child programs the creature to dance. This part of the program suits a seven or eight year old, or a younger child that has learned to read. The dance window contains a grid in which each row accepts one instruction for each of the eight time periods. The top row controls the head; the middle one, the arms; and the bottom one, the legs. The child moves the cursor using the I, J, K, and M keys, and gives the monsters instructions to (R)oar, (T)urn its head, (G)rab, (W)ave its arms, (H)op, or (S)tomp its legs, by typing the correct letter in the correct box. The space bar corrects mistakes. Once the child has programmed in the entire sequence of dance steps, pressing the Return key causes the monster to dance. The child can also go back and modify the eight step dance sequence. (One sequence resembles a 1920's Charleston.)

The third part, a matching game, offers three levels of difficulty. The computer clones a copy of the child's creature and chooses a sequence of motion for its monster. It then asks the child to observe the motion and program his or her own monster to mimic the computer's clone. The child programs the dance grid as before. On the easiest level, only one movement (head, arms, or legs) occurs for each time frame. The game begins with one time frame and progresses as the child masters each sequence. The game doesn't have any penalties, so the child can correct any mistakes without feeling pressured to finish within a specific amount of time.

This delightful game for young children develops a child's pattern recognition skills. While you could easily classify it as an educational program, it resembles skill and action games in developing skills through play and adventure, and board games in teaching a child to think on certain levels.

ROCKY'S BOOTS

The Learning Company
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	C	C-	*Value for Money*

Grades: 4 and up

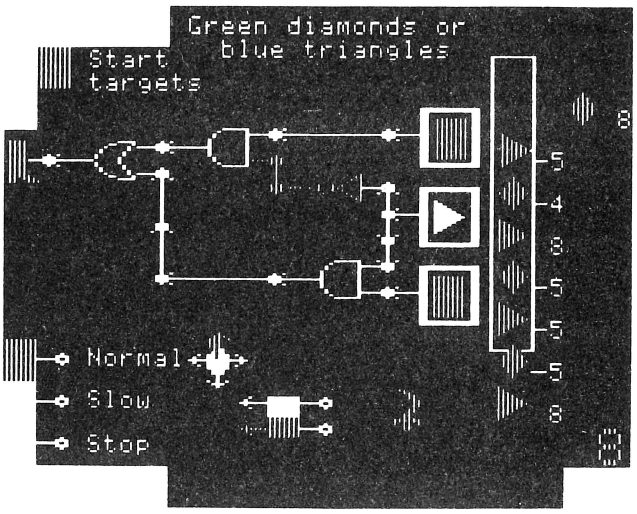
Rocky's Boots is a wonderful educational package designed to introduce children to logic concepts necessary in the design of computer circuits. What is generally a very difficult subject for college bound science students is presented in an enjoyable and exciting series of games in which the child designs kicking machines

to score points against a particular type of target, for instance, blue balls in a field of many colored targets.

The program begins by explaining that the red cursor is like a battery and a source of electrical energy to anything it touches. An electric sign lights when the cursor touches it; an electric clacker clangs; and a boot kicks when its socket is touched. The cursor explores color and shape sensitive sensors that turn "on" (red) when a like colored object or shape passes across their surfaces. The program progresses to the concept that simple machines can be designed by linking wires to kicking boots and then the wire-boot pair to the sensor. If the sensor detects triangles, each time a triangular piece in a train of mixed shape objects passes through the sensor, it kicks the triangle out of line. If the triangles are worth positive points and the rest negative points, the child will score points or win the game. If he builds the correct logic machine, Rocky the Raccoon rewards him.

The concepts become more difficult with the introduction of AND, OR, and NOT gates. First the child plays with a NOT gate. The output is on (red) while the input is off (white). When the child touches the input by turning it on, the output magically turns off. Both the AND gate and OR gates are similarly introduced by touch. To be on OR gates require only one "on" input, while AND gates require both. *Rocky's Boots* then asks the child to build a machine to kick just the diamonds and circles, but not the triangles. The elementary solution requires connecting one OR gate, the kicker, and a wire. The cursor can easily pick up the pieces, and they naturally connect to each other. A blinking arrow shows which two connections will be formed, and pressing the joystick button completes the connection. The player can correct mistakes by using a blue knife supplied for this purpose to cut the parts.The solution to the problem is obvious in that the one input node is connected to the diamond sensor and the other is linked via the wire to the circle sensor. When either one of the sensors is lit by the correct shape passing through it, the boot is activated. Some of the other eight problems are non-circles, the blues, and blue crosses. Many of these problems could be mastered by children nine or ten. I think second and third graders would need considerable guidance to understand the material.

The program doen't end here but becomes more difficult and involved with the introduction of flipflop, delay, and time delayed circuits. The child soon learns to delay the kicker by using a four stroke clock that activates a delay circuit every fourth cycle. It could be used to automatically knock out certain pieces if more than one entered the sensor area at a time. The flipflop is like a light switch. If you touch the bottom input it flips on to the top and vice versa. Both the delay and the flipflop can be added to circuits to solve some of the



more intricate problems. If you send in the warranty card they will send you a set of solutions. I'd advise it, especially to any parent or teacher with precocious children.

Rocky's Boots is a brilliant piece of educational software, and it deserves an award for presenting a very difficult concept in a diverting and enlightening way. It is colorful and logically laid out both in flow and increasing difficulty. It definitely attempts to get a child to think in a logical manner. Unfortunately, children do not gravitate naturally to this program. I tested it on gifted students. Although they easily mastered the concepts of the AND, OR, and NOT gates, they were itching to play a game instead. This leads me to believe that the best environment for this program is the classroom.

In summary, *Rocky's Boots* is definitely a worthwhile package and possibly the best designed educational package that I have yet seen.

Note: The program's protection works strangely with an Integer machine with an Applesoft ROM card. The Autostart must be on, and when the program reboots between sections, you usually need to help it along by resetting.

ROBOT WARS

Muse Software
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B+	B+	*Value for Money*

Grades: 6+

Robot Wars introduces the fascinating concept of programming a robot to battle against other warring robots—the modern equivalent of ancient Roman gladiator matches.

The robot battles become the culmination of your programming ability. After you send the robots into battle, you no longer have direct control over their battle tactics. Each robot's brain, which can hold a maximum of 256 instructions, contains a previously programmed battle plan. Once on the battlefield, the robots (from two to five of them) rotate turns, each executing a single robot language instruction. Obviously, the robot that runs the most effective battle strategy program wins.

A typical battle takes place on a walled-in, square field measuring 256 units per side. Thus, only the winner escapes death. The waiting robots, represented by Hi-Res figures that show the positions of the radar and gun port, begin scanning with their radar as they move to some arbitrary position on the field. Robot A spots the other and fires a shot. Robot B, sensing immediate damage, begins moving out of the firing range, toward a wall, while his radar scans for his opponent. The first robot begins driving for Robot B's last known position in an effort to cut down the scan time taken by his radar. B, lacking the intelligence to avoide the wall, inflicts more damage to himself upon collision. However, he sets his radar on short scan, finds A, and fires. The battle continues until one or the other sustains 100% damage and a winner is declared. The program adds or subtracts points and logs them in the robot's code. Robot battles look dull or exciting depending on the programmed ability of the robots. This is not a spectator sport, however. Only players personally involved would enjoy watching two poorly programmed and poorly designed (a circle and a square) robots shoot at each other.

Each robot has an accumulator to perform math, a pair of index registers to help control the program flow, twenty-six memory registers, and seven input/output registers. These last registers store information like X and Y position, X and Y speed, the aim angle of gun and radar, amount of damage, and length of time before a shell explodes. Another register generates random numbers. The language resembles BASIC in syntax, but Machine language in logic. You enter the code in a full-screen text editor and save it to a source disk initialized by the program. A cross-compiler then assembles the source code into Machine language instructions. You can watch the assembly and control the speed by turning the paddle.

You test the robot on a test bench before sending him into battle. Here, you watch the microcomputer in action, speed it up, slow it down, stop it, and look at any of the registers. The right side of the screen displays the counters for horizontal and vertical position and speed, radar, gun aim, shot fired, damage, accumulator, program counter, and which register is being watched. You can change this last item to suit your test. Press the paddle buttons to simulate the presence of another robot and to simulate damage to your robot to see how your robot will react in an actual battle.

Although lengthy, the documentation is clear and understandable. The author provides some simple examples for you to study. If you watch these fights, you'll soon realize that a good robot requires much more complex programming. You also get a list of spare parts suitable for use in your first few robots.

Robot Wars has a two-fold purpose. Of course, it entertains, but it also introduces and teaches an introduction to Assembly language programming. For this reason, beginning BASIC programmers or non-programmers will find this game rather difficult to play. Assembly language and Robot language require exact, careful planning. Finding and eliminating mistakes, even with the help of a good debugger like their test bank, hardly proves a simple task when values are stored and used in various memory and operating registers. I have no doubts as to this game's excellence, but I think that many game enthusiasts will buy this language-oriented game and never use it after watching the demonstration because of the difficulty of understanding and mastering the programming of the robots.

APPLE SUPERPILOT

Apple Computer Inc.
$200.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	B+	A	*Value for Money*

Grades: 7 and up

Apple SuperPilot, classified as a computer aided instruction (CAI) language, allows you to design lessons for fun as well as for learning through the use of graphics, music, and color. You determine the placement of questions, acceptable answers, and the order of instructions. The package comes complete with two manuals and five disks. The Editor manual describes the modes of operation, how to use the different editors, and overall operations. The Language Reference manual deals with detailed instructions and aids to problems that might develop. *Apple Super Co-Pilot*, a two disk program, introduces the novice to *SuperPilot*. It provides a good overview of the main program's capabilities and gives you a taste of how easy it is to program lessons. The Author Master disk (with backup) and a lesson disk with sample lessons complete the package.

When I first read through the manuals, the seeming ease of building lessons surprised me. Indeed, it was misleading. The program consists of twenty-six different instructions, with only nine common in most programs. The number of combinations possible gives the program enormous flexibility. This makes it versatile, but also difficult for a novice. You may not need experience in programming—but it helps, mostly because of the way the program is laid out.

The program is menu-driven, making it easier to move about within it. The four editors built into the *SuperPilot* system consist of:

1. Lesson Text Editor. This permits you to enter material into a structure for use as a lesson, creating the main body of a lesson.
2. Graphics Editor. This lets you draw, graph, or chart information and store it to disk in either a Quick-Draw mode or standard graphic form. You can easily recall this information to include within a lesson.
3. Sound Effects Editor. With this section you can create sections of music or other sound effects for include in a lesson.
4. Character Set Editor. This lets you create special characters and text for display and use by your program.

Using these four editors, you can build an educational experience for your students. After using the Text Editor to build the question and answer section, you can add shapes and lines with the Graphics Editor, using a form of Turtle graphics or some of the ready-made forms. The Character Set Editor adds large or different fonts where you want emphasis. Adding sound routines provides finishing touches, if desired. You have finished a lesson rival to any commercially prepared package, limited only by your imagination. To create a truly great lesson requires much time, effort, and creativity. Don't expect to sit down and make a masterpiece on the first try. Once adept, you can bring the world to your students.

BASIC RAM DATABASE

AV Systems, Inc.
$49.95
48K; II+/IIe/IIc

Overall Rating	B-	C+	*Reliability*
Ease of Use	B-	C-	*Error Handling*
Documentation	A	B	*Value for Money*

Grades: 7-Adult

What is a RAM database? Well, it is a method of using your computer's RAM chips (Random Access Memory) to store the data that you are working with. It is therefore limited to the amount of memory available in your computer, up to a maximum of 64K. How it works and is programmed to do what you want is the subject of this program.

Basic RAM Database takes you through the basics of this database program with the use of a cassette tape and an excellent seventy-page manual. When you finish entering the information as requested by the tape, you return to the manual where you find the program broken down into sections. There are thorough descriptions of the main lines of the program and explanations of what they do. Working from the documentation, you can change the program to work just the way you like.

The emphasis here is on the educational aspects of the program, however. As a database, it really is basic and limited. In an average class, you could quickly scan through the program and documentation in a couple of hours. Or, you could spend a week or more breaking down a particular section, learning how it works, or expanding it.

AV System's policy for making copies of both the program and the manual is very liberal for schools. This is a definite plus. On the other hand, as in other AV programs, there is a limited amount of error trapping which requires you to be very exact when typing in

information if you are to go through the program without any error messages popping up. The reason is that excessive error trapping would make the program longer and more difficult to understand. Why not include additional information on how to error trap so you can clean up the program after dissecting it?

THE GRAPHIC PROGRAMMER

AV Systems, Inc.
$49.95
48K; II+/IIe

Overall Rating	B	C	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	B+	B	*Value for Money*

Grades: 7-Adult

If you need a "no frills" educational tool for teaching graphics programming, why not look into this neat little package? Using small listable programs, and instructions on tape for you to follow, this program helps teach: low-res programming, hi-res programming, shape table drawing, graph/chart drawing, two- and three-dimensional drawing, animation sequences, automatic draw/save, and picture compression. You can copy the program for as many students as you wish, so each can work at his own pace while following the audio portion of the program.

The lessons are presented as straightforwardly as possible, with a minimum of added routines. Unfortunately, this means that there is little, if any, error trapping, so each step must be followed precisely. If you don't get carried away, though, this shouldn't pose any serious problems.

The tape and manual include short discussions of each drawing routine. The most unusual program is the one that slowly fills a disk with graphic shapes, taking ten hours to do so. You can let this one run while you sleep.

This package does not expect you to become an expert overnight, nor to be able to program a masterpiece, but it will acquaint you with the skills needed to add graphics to your own programs.

ROBOT ODYSSEY I

Learning Company
$49.95
64K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A	*Value for Money*

Grades: 9 and up

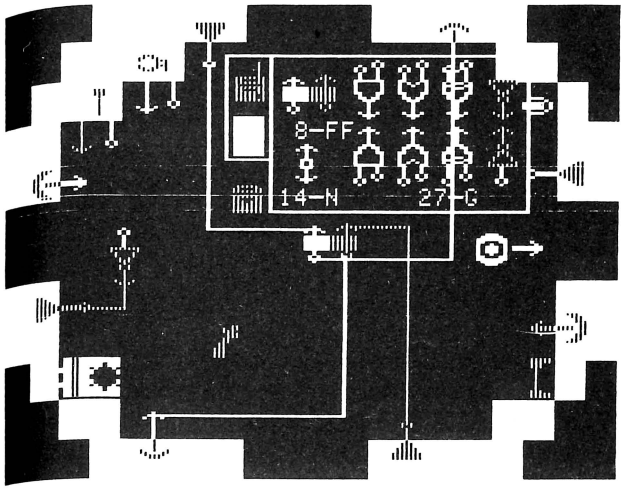
Robot Odyssey I, the sequel to *Rocky's Boots*, teaches how to design electrical circuits to control the motions of a robot. To some it is an advanced educational simulation that introduces teenagers and adults the concepts in creating complex computer hardware. To others it is an adventure game in which they need to modify their robots to explore and escape the five level sewer system beneath the city of Robotropolis.

The program, which is divided into three parts, is one of the most advanced and complex educational simulations that I've seen. First, there is an entire disk side of Robot Tutorials that explain how to program robots. The three part course begins with Robot Anatomy. Here you learn how to move and go inside robots and examine robot parts. You learn how robots move, grab, sense objects, and send signals. And you learn that robots contain a battery, thrusters, bumpers, antennae, grabbers, and eyes.

Once you have mastered the basics you are ready to delve into robot circuitry with the Toolkit. Here you learn how to program robots by building simple circuits. With your joystick-controlled soldering gun you can stretch a wire from, say, a left bumper sensor to the left thruster and get the robot to bounce off the wall that it bumps. Once you learn to use the logic parts inside your Toolkit (And, Or, Not, and Xor gates), flipflops, and nodes, you can design robots that can perform complex motions. For example, if you connect the left thruster to the left bumper sensor through the left side of a flipflop gate, and the right thruster to the right bumper sensor through the right side of the flipflop gate, you can build a bottom wall crawler that will bounce between the side walls. Likewise, you can design a key grabber using a sensor connected through a flipflop gate to the robot's mechanical claw.

Since wiring can get quite complex if your robot needs to perform complex movements to negotiate a maze, it is possible to design and burn integrated chips containing sequences of logic gates, flipflops, and nodes. Chips can contain other chips and their eight pins can be connected to chips, gates, or robot parts. This is all covered in the tutorial on Chip Design.

The Innovation Lab, the second world in the Odyssey, is a robot workshop. Here you can design, build, and test robot circuits and chips. It contains three



robots and all the tools you will need to program them. It has a chip facility where you can design and burn chips, and a large area where you can design mazes to test your robot's navigational ability. You can save your chip designs or the robots you create on disk.

Robotropolis is the adventure game portion of the program. It is a five level underground city populated by robots. In order to escape the maze, which is filled with puzzles and obstacles, you will need to carefully program your robots. Each level is harder than the last.

From the City Sewer, you have to use the blue key to gain entry. You'll have to negotiate the sewer labyrinth using the map in the instruction manual, then past a sentry robot in the sewer grating. You collect objects along the way and avoid the "ampire bot." There is a definite trick here that involves placing one of your three robots inside another.

Other levels (like The Subway where you need to find a five bota doken to ride), require you to rewire a robot. The Town, which is the entrance to the master Control Center, will require knowledge of chip design. By the time you reach the Skyway (level five), you will have mastered quite a bit of robot design. Here you explore the main boulevard in search of a key, sneak by a sentry robot, ride a giant disk drive to retrieve a new key, open a sonar lock by sending out patterns of antenna beeps, and . . . Since many of these events require special timing you will need to design some intricate chips in the Innovation Lab.

This program sounds complex, and it is. The vendor claims it's geared to teenagers, but they don't mean your average fourteen-year-old. It requires a lot of time, effort, and thought. I'm talking about a gifted teen who has a strong interest in robotics and electronics. I think it is more suited to advanced high school and college students. There is no doubt about it, *Robot Odyssey* is innovative and can teach fundamentals of digital logic and circuit design.

THE VISIBLE COMPUTER: 6502

Software Masters
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Grades: 9 and up

The Visible Computer: 6502 combines a 140-page tutorial with thirty progressively more difficult disk programs as an instructional package which leads the beginner, step-by-step, in understanding and using the fundamental concepts of Machine language programming.

Chapters 1 through 3 are preparatory background on what Machine language is, binary and hexadecimal numbering systems, and computer hardware. Later chapters acquaint you with The Visible Computer (TVC) including boot up procedure, display terminology, parts of TVC, and general rules for entering commands; it also shows methods of examining and changing memory contents.

Chapter 15 provides three programs which illustrate the main purposes for using Maching language—sorting, Hi-Res graphics, and tone generation. Chapter 16 concludes the tutorial by providing you with a suggested reading list, a list of available Assembly and Machine languages, and pointers to further your skill in Machine language programming.

The package is one of the best on the market. Documentation is clear, the learning progression is logical, and the display is visually appealing. This is definitely a good buy for the beginning Machine language programmer.

THE APPLE'S CORE

The Professor
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C+	B	*Value for Money*

Grades: 9-12

The Apple's Core is a software package designed to teach basic Applesoft programming to beginners. It includes one program or teaching disk, one tutorial or practice disk, and an instruction manual-text.

This package uses "modules" to teach concepts. Each module consists of three parts or sections. The first part uses the program disk to explain the concept.

The second section is in the instruction manual; here you will find additional text, hints, suggestions, and explanations. The third part of the module is the tutorial disk which the learner uses to practice concepts covered in the text or instruction phase.

I found that the students who closely followed the instructions profited most from the program. Recommended procedure is to work through a section of the program disk, then go back and review that section twice before going on to the tutorial disk. Students who did not do this were repeatedly flipflopping between the two disks because they had not mastered the basic concept before trying to apply it.

Programming concepts in *The Apple's Core* range from variable and print statements to FOR...NEXT loops and GOSUB statements. Some other concepts covered include line numbers, editing, input and GOTO statements, counters, and multiple statements. A module treats each of these programming concepts.

The program has many good features. An invaluable one in the classroom is the continuation option. Inevitably, when a student starts on a program, time will run out before he can complete it. Usually, he has to start back at the beginning the next time he has access to the computer. Because of *The Apple's Core's* continuation option, the student can recommence wherever he left off.

The vocabulary of the program does not lend itself to students below the junior high level. Even at this level some students needed additional interpretation to understand some concepts. There are sections in the instruction manual-text that would benefit from a little more substance, especially if this is to be a beginner's package.

All in all *The Apple's Core* is a worthwhile package for the person undertaking beginning computer programming. It also makes a good supplement for the person who might be taking an elementary programming class and needs additional material, or who is attempting to learn programming from one of the numerous texts.

HOW TO PROGRAM IN BASIC LANGUAGE

Sterling Swift Publishing Co.
$74.95; workbook is $6.95 extra
48K; II+/IIe

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	C	B+	*Value for Money*

Grades: 9-12

How to Program in BASIC Language is for people interested in computer literacy; it is a tutorial approach to learning BASIC. The instruction consists of twelve lessons in programming fundamentals. Two of these lessons list possible applications for business usage, and such handy things as computing your heart rate.

The program begins with the assumption that you have no prior knowledge about computers whatsoever, not even how to turn it on. The tutorial phase lists information and asks questions about what you have learned, requiring a single entry or a short answer. An occasional "hands on" question will require you to type out an entire line. Though not as thorough as a book, *How to Program in BASIC Language* gives a general overview of BASIC, including if/then conditionals, loops, arrays, and even Lo-Res graphics. I found it necessary to follow a standard book on BASIC programming to understand and apply the concepts taught in *How to Program in BASIC Language*. The "hands on" method is used infrequently and doesn't give you any idea of how to apply the learned materials.

The workbook reinforces the concepts you are learning and asks you to apply them on the computer. The primary difficulty with the workbook is that it is oriented toward use without the teacher. Another problem is that there are no answers to the questions asked.

Compared to other "how to" programs, it is less expensive and one of the few with "hands on" training. Using the workbook with the support of a knowledgeable teacher in a classroom situation would make this program highly useful to the beginning programmer. But as a personal tutor it falls short of that goal. Learning by the book still seems to be the best way to learn BASIC.

SORTING TECHNIQUES I

Microcomputer Workshops
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	C	A	*Value for Money*

Grades: 9-12

Sorting Techniques I is a collection of five sorting programs along with a demonstration of how each works, appropriate for high school classes (and beyond) in computer science. This program presents bubble sort, selection sort, insertion sort, shell sort, and quick sort in BASIC and then demonstrates them graphically. You can set the demonstration to give a fast overview of the comparisons made or a detailed, step-by-step discussion where the student can watch exactly what happens.

A scant six pages of documentation allow no elaboration of the programs, but they are clearly and concisely written pages. At any rate, the program is so complete that it really does not need excessive documentation. The documentation mentions neither copy protection nor a warranty, but gives permission to copy the documentation for classroom use.

SORTING TECHNIQUES II

Microcomputer Workshops
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A	B	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	C	A	*Value for Money*

Grades: 9-12

Sorting Techniques II is a collection of four sorting programs along with a demonstration of how each works, appropriate for high school classes (and beyond) in computer science. The program presents heap sort, link sort, binary search, and shaker sort and then graphically demonstrates them. You can set the demonstration to give a fast overview of the comparisons made or a detailed, step-by-step discussion where the student can watch exactly what happens. The programs in this second set of sorting techniques are more involved and are harder to understand than those in the first set.

The documentation now consists of eleven pages, including some examples and more details on the programs. It remains clearly and concisely written. It does not mention copy protection or a warranty, but gives you permission to copy the documentation for classroom use. Students will appreciate this collection of valuable sorting techniques and the helpful explanations of how they work.

GRAPHICS TIP DISK

Locus Systems
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	D	C	*Value for Money*

Grades: Adult

Computer assisted education in graphics programming is an idea that makes good sense. Unfortunately, this program operates more like a text book than an interactive education program.

On booting up the disk, you're presented with a menu of lessons in graphics. There is instruction in high and low resolution plotting and drawing, screen dumps, peeking and poking on the screen, shape tables, animation, and screen distortion correction. The instruction sections are clear and concise. Examples are used liberally and effectively.

Unfortunately, the only thing that you get to do is watch the screen and push a few keys to change screens. The documentation consists of eighteen lines telling what the program does. There is mention of the limited selection of supported printers, but no discussion of other hardware requirements, including on which computers the program runs. Since the program is mostly self-documenting, this doesn't pose a large handicap in using it, however.

If the *Grapics Tip Disk* allowed more user interaction, it would be a fine educational tool.

ENTERTAINMENT

ENTERTAINMENT

Introduction

Sure, your Apple is a powerful personal computer that handles some of your most important, practical tasks. But it likes to have fun, too. Its fine color and sound capabilities make it an excellent game machine.

Computer games have perhaps the most interesting history of all software types. They've evolved over the past seven or eight years from simplistic low resolution *Pong*-type games into the lengthy, high resolution simulations and high-speed, arcade-quality games reviewed here. The days when the hi-res screen was a mystery to all but a few, and lo-res was the standard for the average game programmer have passed. Each new generation of games is bigger, brighter, and faster than the previous one as programmers strive to give the public, which has been spoiled by the best Apple games, more for their money. Prices tend to be high, so players want games that will be interesting and challenging for a long time. This is especially true since more and more game companies are protecting their software so it cannot be copied or traded.

Computer games are comparable to novels. The hundreds of novels written each year have only a handful of plot types. Regardless of how well they sell initially, few titles sell for longer than a few months. However, the handful that become classics continue to sell to newcomers year after year. The computer world has a similar elite, including *Zork, LodeRunner, Flight Simulator*, and *Raster Blaster*. And they have been endlessly imitated. We regularly see potential in new programs, but technology is advancing so rapidly even these classics may soon be considered primitive compared to home versions of interactive video games such as *Dragon's Lair*.

Games are becoming more graphics-oriented. Adventure games which used to be primarily text now include colorful graphics depicting locations and even hints. Many games include modules for creating or modifying the basic game to suit the players' tastes. Shoot-'em-up games use true perspective, faster action, and even three-dimensional effects. Very realistic 3-D games put the player in the pilot's seat more realistically than ever before.

We have divided the reviews in this section into many categories to keep similar programs together. Within each section the programs are arranged alphabetically. Each section will give you a good idea of which programs are good, which are turkeys, and which you might enjoy playing. As you read the reviews, keep in mind the aspects of each game type that are important to you, and look at all the grades. If you don't like a certain type of game, don't assume because we've given it straight A's that you'll have a change of heart. And remember, just because we downgrade a program doesn't mean you won't like it. Read the reviews to find out why we assigned the grades. Maybe the problem we cite won't bother you in the least.

Games are one of the most personal of software types. While shopping you should consider whether you prefer joystick or paddles, keyboard control, or a mouse. Do you want graphics in your adventure games, or are you an all-text purist? Just because a game uses low resolution graphics doesn't mean it's bad—perhaps the simpler graphics are perfectly adequate and high resolution would be unnecessary. Shop carefully. Look for games you'll play over and over, and don't forget, your Apple wants to have fun.

—Mia McCroskey

General

BEAGLE BAG

Beagle Brothers Micro Software, Inc.
$29.50
48K; II/II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	B+	D-	*Value for Money*

Beagle Bag is a disk full of games for you and your Apple computer. Also included are two menu programs for you to copy onto your own disks. The games are not of the Hi-Res action variety, but of the puzzle and brainteaser type. Each can be played separately.

One of the games, *Buzzword*, allows you to insert crazy words into stories by specifying the first letter of the word. Or, you can write your own nonsense stories by letting the computer fill in nouns, verbs, and adjectives. *Elevators* is a challenging game which simulates the actions of a set of elevators during rush hour. Your job is to operate the elevators efficiently for a predetermined length of time and to eventually empty the building. *Texttrain* allows your choo-choo to tug around letters and to link and unlink them into words while the clock times you. *Sub Search* lets you seek the invisible enemy and capture his supplies before yours run out. There are also *Hang Person* (a unisex Hang Man), *Plenty Questions*, *21 Numbers*, *Name Game*, *Oink*, *Pick-a-Pair*, *Slippery Digits*, and many more. These games vary in theme from "trick your friends," to mind challenge, or race against the clock.

This is not *Pac-Man*; this is not even *Little Brick Out*. This is Solitaire with or without a friend. While these games are interesting and even a little challenging, you leave the computer feeling unfulfilled. *Beagle Bag* is an assembly of tricks and games that you might undertake on a rainy day after you have washed the clothes, patched the screen door, and catalogued your entire floppy disk collection. This bag of beagles turns out to be no barrel of monkeys. The Beagle Brothers should really offer this disk as a free bonus for trying their other software.

I.Q. BASEBALL

Davka Corporation
$24.95
48K; II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Creativity	B-	B-	*Graphics*
Documentation	C	B	*Value for Money*

The pitcher winds up and throws the ball. A multiple choice question appears on the bottom of the screen. A wrong answer now may mean an easy out. You press the key for the right answer and it's a fly ball...toward left field...it's a double! Now, with two men on base, the pitcher throws another ball and another question appears. "Which stadium does not have field lights?" Why, of course you know that...

Trivia questions on all phases of baseball fill this disk, ranging from which team won three series in a row to which batter hit the tie-breaking run on that fateful day in the early 1900s. Luckily, when you start the game you can choose between minor or major league questions. To add more spice, you can also swap the disk for one of the twenty-seven supplementary question disks. Of these possible supplements, which cost $14.95 each, you can choose from the American League teams, National League teams, or even a special World Series disk.

Enough of the questions, what about the game? When you start, you see a few screens of graphics and hear a couple of exceptionally well-made sound routines, including barkers selling hot dogs and peanuts. The remaining graphics are relatively straightforward; the only action involves the pitcher throwing the ball and the runner going around the bases. During the seventh inning break, the barkers return for a few seconds before the game continues. Upon completion of the game, you learn whether or not you've won—if you haven't been watching the score throughout. You can quit between each inning or continue another game when you finish nine innings. Don't consider buying this program for the game itself—buy it for the baseball trivia and history if you're interested.

JIGSAW

Microlearn (A Division of Micro Lab, Inc.)
$30.00
48K; Apple II+/IIe

Overall Rating	C-	Medium	*Challenge*
Creativity	B	C	*Graphics*
Documentation	N/A	D+	*Value for Money*

As the title implies, *Jigsaw* offers the puzzle enthusiast an opportunity to solve a multitude of 180-piece jigsaw puzzles on the computer. You can construct a puzzle from any of seven pictures that come with the program, or from a picture that you have created and stored on disk. You can also save up to four puzzle games on a DOS 3.3 initialized disk in case you don't complete a puzzle at one sitting. Each time you load a picture, the program creates a new puzzle in that it defines a different set of shapes for the 180 pieces.

Whether you load an old game, load your own picture, or load one of the supplied pictures, a fixed set of keyboard commands allows you to move puzzle pieces from a storage area to a puzzle work area. You can toggle the display between the completed picture, the puzzle work area, and the storage area. Actually, you can move only six pieces at a time, turning them upside down if you wish before moving them, one at a time, to a fixed position in the work area. When you add this to the sheer number of keystrokes required to get a piece from the storage area to its final destination—well.

What makes doing a puzzle with *Jigsaw* even more difficult is the highly irregular shape of the pieces when compared to the traditional rounded shapes of a cardboard puzzle. This irregularity and lack of clear definition of the pieces makes using a color monitor almost mandatory. Even then, some pieces seem to have a different color alone, as compared to their final location in the completed picture. Worst of all, you miss the flexibility of moving, rotating, and testing various pieces of puzzle in various places.

While *Jigsaw* represents a novel idea in the sometimes boring proliferation of software games coming on the market, jigsaw puzzles really aren't any fun on a computer and should remain on the dining room table.
color monitor recommended

PICK THAT TUNE

Swearingen Software
$29.95
48K; II/II+/IIe/IIc/III

Overall Rating	C-	Easy	*Challenge*
Creativity	D	N/A	*Graphics*
Documentation	B+	C-	*Value for Money*

There is now a computer version of *Name That Tune*. The rules are just like those of the T.V. show version. The Swearingen's (Randall and Mary) have faithfully duplicated the original game. There are 100 tunes, divided into four categories. The player picks a category of tunes and then guesses how few notes it will take to successfully name that tune. The most points go to the player who guesses the tune in the fewest notes. To add a little zip to things, they've included some variations on the degree of difficulty, and penalty points for wrong answers. There is even the opportunity to go down in magnetic history by being one of the top ten scorers on the disk.

One item makes tune recognition difficult. While the notes are accurate, they do not always proceed with toe-tapping precision. Another item limits the useful life of the game. With only 100 tunes, it is not long before the gamester becomes familiar with them, and the game soon loses its challenge. Those who didn't enjoy the T.V. show will probably want to pass on this one.

PQ—THE PARTY QUIZ

Suncom
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Documentation	B	B	*Creativity*
Value for Money	B	N/A	*Graphics*

PQ—The Party Quiz is a trivia game designed for up to four players. Suncom, aware of the problem of players crowding around a keyboard in order to enter their answers, designed and included a set of four quick-response controllers with six-foot cords. Each has four large buttons for answering the mostly multiple choice, but some true/false, questions. All are connected via telephone modular jacks to a control box, which in turn is plugged into the paddle port. (Only two players can play with the Apple IIc.) Individual controllers make the game easier to play and give the players the feeling that they are part of the game, not waiting for their next turn.

PQ is very fast-paced, but it can be modified to fit the player's thinking speed or response time and the number of rounds to be played. Each round consists of ten questions, and all players compete. The game can be played in either the competition or social modes. In the competition mode, the first person to correctly answer the question receives all the points; the quicker the response, the more points are awarded. In the social mode, each player who answers correctly receives points determined by how much time is left on the timer when each answers. The social mode is better, for it eliminates the blind guesser who happens to get a few answer's correct without reading the question. In the social mode, anyone who tries to beat the question trips the cheat flag and isn't allowed to answer. The questions, which are randomly loaded from the disk, consist of general trivia: for example, "Who is Howdy Doody's twin brother?" There are 2,500 questions on the two-sided data disk. Other disks featuring sports or entertainment are available for additional charge from SunCom.

Once every five rounds there is a lightning round. Here each player gets to answer as many as ten questions in only ten seconds. Speed readers and good guessers have the advantage. The lightning round gives players a chance to catch up. The overall winner is the person who has the highest score at the end of the game. High scores can be saved to disk.

SHIFTY SAM

Random House
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	Medium	*Challenge*
Creativity	B	A	*Graphics*
Documentation	A	B-	*Value for Money*

This clever and handsomely produced word game challenges you to make a list of words using the letters the program gives you. The element of gambling works into the game cleverly and the sly, animated dealer proves a knowledgeable and worthy adversary. The mechanics of the game involve betting Shifty Sam that you can make so many words from one of the thirty words of seven letters each in the program. For each legitimate word, you win cash based on the number of letters in the word and the number of different words entered. Success, however, entails risks—playing the long shot beyond the odds Sam offers.

The disk has enough room for you to add five new words to the game list. The word bank menu also allows you to change, delete, and display words, plus alter game play as desired as long as the words don't exceed seven letters. Splendidly colored Hi-Res graphics throughout enhance the game. Sam himself is perfect. With striped shirt and sleeve garters, dealer's visor, black mustache, and knowing expression, he greets you from behind his table, cards in hand. He looks down at the table with furrowed brow, then looks up and says, "Let's see" as he announces how many words he can make from the game word. He bets $50 or so that you can't derive a certain number yourself and asks you to call or raise. If you call, Sam responds sarcastically, "Sure you can spare it, Big Spender?" Of course, you can raise Sam's bet and go for the big money. With the bet settled, Sam looks down and deals seven cards. The animation is smooth and quite effective as Sam's eyes shift back and forth as he deftly spreads the cards before you. You then have ninety seconds to type in your list. Careful—Sam is alert to repeated or nonexistent words and will catch you on them. A snide comment greets failure, but success gets a compliment and the offer to go double or nothing.

This good game, colorfully and intelligently done, remains open-ended because of the options for change. One unavoidable drawback: the game word appears before you start the clock, letting you write down all the permutations before you begin to play if you want to cheat. Still, since the game tries to enhance word skills by having you break down one word into many others, the idea works whether you cheat or not. One or two players of whatever age (except very young) can choose one of three levels of difficulty. Clear documentation tells you how to run the program. When added to all its other features, the good, bright graphics, sharp sound effects, and smooth animation make *Shifty Sam* both fun and educational.

Arcade
General

A2-PB1 PINBALL
subLOGIC Communications Corp.
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	B	A	*Graphics*
Documentation	A	A	*Value for Money*

A2-PB1 Pinball, the most realistic pinball simulation yet to appear on the Apple, will please the hard-core pinball fan. This version, called *Night Mission*, follows the classic design features of modern pinball games, yet does not attempt to copy any one machine. Overall, with its five bumpers, seven standup targets, nine rollovers, two spinners, a dive bomb chute, and a hole kicker, it makes a very exciting game. The actual layout is also well designed, with no dead spots.

Bruce Artwick went a long way in the realistic design of this game. He includes features not normally expected in a computer version, but features that are nonetheless an integral part of a real machine. He includes a quarter coin slot and start procedure for multi-player play identical to that of an actual machine. In addition, he includes the match feature for a free game. By studying and measuring the features of numerous mechanical pinball games, he concluded that there was no average set of parameters that would suit a majority of players. Thus, rather than compromise, he allows the player to adjust the parameters to suit himself.

Thirty-three individual parameters can be adjusted. The variations are so different that ten of the modes are preset with easy access by setting only the mode number in the FIX mode. Others that the user can specify can either be set for one time play, or saved to a separate disk. (One mode and one high score on a disk.) For example, you can vary the impulse and time delay of the hole kicker, the tilt sensitivity (yes there is tilt triggered by the keys on the left and right side of the keyboard), ball speed and trails, bumper impulse, flipper power, spinner friction, and forward include of the machine. There are others that affect the sound and the scoring. One adjustment called "ball trails" gives a "cosmic effect," in which the ball appears as a Slinky as it bounces around.

You can hook up for sound with either the Apple's small speaker or by running the cassette output port to your stereo. The sound effects are very good in this game. Sounds range from the sound of an airplane engine, to high pitched whistles and explosions. After all, this game follows the theme of a B-17 on a night mission over Japan where various cities are the targets. That is why the game's output includes a bomb release (vertical chute), and a dive bomb chute (U-shaped tunnel with a spinner at the end).

The graphics are stunning and rich in fine detail. There is a considerable amount of fine, detailed writing on the playfield that shows up clearly on a color monitor, and doesn't interfere with the drawing of the ball.

ADEPT (Archon II)
Electronic Arts
$40.00
48K; II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Documentation	B	A	*Creativity*
Value for Money	A	A	*Graphics*

In this sequel to *Archon*, the Master of Order struggles against the Mistress of Chaos in an attempt to hold territory in the realm of the four elements: Earth, Water, Air, and Fire. While the game has some of the same play mechanics of the original, magic is the key in *Adept*. Players control five adepts (or magicians) in this head-to-head contest between two human players, or the computer and one player. As in *Archon*, the goal of the game is to control six power points on the board.

The game board is composed of four bands representing the classical elements of Earth, Water, Air, and Fire. These bands radiate outward in the above order from two citadels, the home sqaures of Order and Chaos. There are also two neutral squares that have permanent power points. Four others move from turn to turn through the outermost corners of the four elements.

The game action operates entirely through magic spells cast one per turn by one of the five adepts. Since using magic costs energy, it is important to spend as much time as possible on a power-giving square. It also costs energy to maintain the demons and elementals you conjure up. Though moving adepts between ele-

ments is nearly free, they are best used to conjure spells in the element they are aligned to.

Summon is the most useful spell, since you need an army to fight your battles. You have a choice of four powerful demons and four less powerful elementals. The energy bar on the side of the screen shows the amount of energy required to summon each. The more powerful the demon, the more power summoning takes, and these powerful creatures can only be placed on the same element with the adept who summoned it. You have access to an unlimited supply of demons and elementals. You do run out of energy summoning them, especially powerful demons.

Each creature has special abilities, which—like the adepts'—are enhanced when they are on the element they're aligned to. A firebird, for instance, is more powerful when it's on a fire square. This game has some new creatures among them: the Wraith, who is invisible except when it tries to hurt its opponent; the Siren, whose wailing sound brings death; the Juggernaut, who is, in effect, its own missile; and the Oorgon, who does not wound, but slowly paralyzes his opponent.

As in *Archon*, *Adept*'s battles take place in an arena where you maneuver with a joystick. Barriers between the elements have a different effect on both the monsters and missiles. Fire is dangerous, and slowly wounds any creature, while Water and air barriers only slow them down. Air barriers deflect missiles, while Water (again) only slows them down. You can't fire continuously, only after the low pitched bell (for Chaos) sound. You must stop at the sound of the high pitched Order bell.

Adepts can also conjure up other spells. Some, like Heal, Weaken, and Imprison, cost only a little energy, while spells such as Banish, and especially Apocalypse, cause an enormous energy drain. You should use the latter as a last resort; it always begins the battle that ends the game. In it, your creatures' lifespans, missile power, and missile speed are dependent upon your magical energy, and the number of creatures and Adepts left. While it is intended to put a hopelessly overwhelmed enemy out of his misery, some players use it unfairly to assure victory over an opposing player who has weak hand-eye coordination. Fortunately, badly weakened players don't have enough energy to even dream of using it.

The game, which can be played by two players, or one against the computer, requires joystick(s). Usually one player uses a joystick and the other a matrix of nine direction keys and the spacebar on the keyboard. However, those who have a two joystick adapter such as the TG Switch adapter will find the game much more controllable and enjoyable.

I think *Adept* is a better game than its predecessor because it requires you to come up with more (and cleverer) game strategies to secure your victory. In *Archon*, players just slug away, attacking square after square, until the better player wins. It is not a thinking game. In *Adept*, players must contend with energy drain, and actually conquer territory. It's a much more subtle game. The game's graphics, like those in *Archon*, are good. It is a little easier to identify pieces in this sequel, as they exhibit more striking differences. Game play is excellent, and the game will hold any player's interest for a long time. *Adept* is an outstanding two-player game; it can, however, become a somewhat frustrating contest against a strong computer opponent.

ARCHON

Electronic Arts
$40.00
48K; II/II+/IIe/IIc

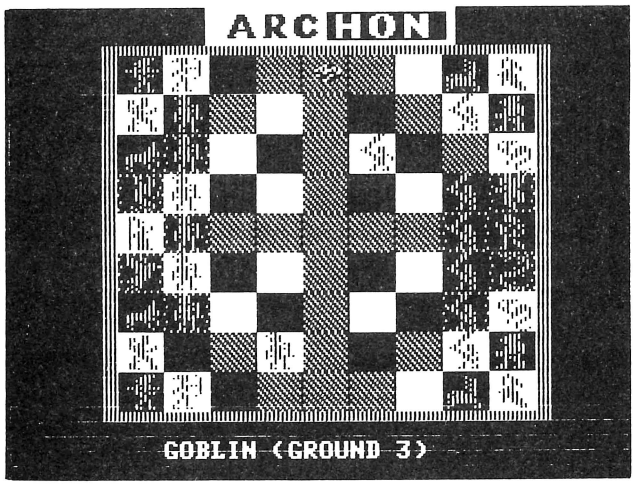
Overall Rating	A	Hard	*Challenge*
Documentation	B+	A	*Creativity*
Value for Money	A	B+	*Graphics*

Recall those humorous scenes from the movie *Star Wars* in which R2-D2 and Chewbaca are playing a chess-like game aboard the Millennium Falcon. The droid's game piece, projected by hologram as a life-like, goblinesque creature, advances across the board to the square occupied by his opponent's piece and slays it. They must have been playing a futuristic version of *Archon*.

Imagine a strategy board game similar to chess with fantasy-role-playing characters as pieces. The object of the game is to defeat each of your opponent's pieces in battle, or control the five power points on the board. Like chess, each piece has relative strengths and weaknesses, and specific movement characteristics. Unlike chess, the Light and the Dark sides have completely different game pieces that, on the whole, are equal in strength. Each side's game piece has a counterpart with similar strengths and weaknesses, but different fighting styles. For example, the equivalent piece to the pawn in chess is a sword-wielding knight for the Light forces, and a club-wielding goblin for the Dark side. The Light forces have one wizard, two unicorns, two archers, two golems, two valkyries, one djinn, one phoenix, and seven knights. The golems throw boulders while the djinn hurls whirlwinds, and the unicorn fires energy bolts. On the other side, the Dark forces have one sorceress, two basilisks, two manticores, two trolls, one shapeshifter, one dragon, two banshees, and seven goblins. The basilisks attack with an eye beam, the manticores with tail spikes, and so on. Both the Light

force's wizard, and the Dark force's sorceress can cast spells in addition to fighting with fireballs and lightening bolts, respectively.

The battlefield is separate from the strategy board screen. When two foes challenge each other by occupying the same light, dark, or neutral colored square, they fight in a combat arena that has barriers carrying you through a luminosity cycle. When the barriers match the color of the background, they disappear. During the few brief seconds before and after this moment, opponents can walk through the barriers or penetrate them with missiles. The barriers slow them down. Meanwhile, lifelines at either end of the screen indicate the relative strength of each opponent. When one is wounded, its lifeline is reduced in proportion to the severity of the wound. When the lifeline is zero, the icon is "dead," and combat is over. Combat is a combination of strategy and dexterity skills. A weak, club-wielding goblin can sometimes defeat a powerful unicorn who hurls fast energy bolts, if the goblin can corner it and beat it over the head without being hit by the first bolt. The graphics during battle boast excellent, realistic animation.



Both the wizard and the sorceress are powerful pieces that should not be removed from the safety of their power square. These squares are important in that they accelerate the healing of battle wounds. The ability to cast spells by these two icons is important to the game's strategic play. There are seven spells and each can be used only once. Some of the more interesting spells can teleport a given piece to any other place on the board, exchange any two pieces on the strategy board, revive a dead icon, imprison an enemy icon, or summon an elemental spirit. (This latter spell is particularly useful in attacking a very powerful enemy piece.)

The imprisonment spell is useful for keeping an enemy piece on a designated square. During battle on a light square, the Light forces have the advantage; conversely, the Dark forces have an advantage on the black squares. Many of the squares (especially the neutral ones) cycle from light to dark in a set pattern. If a piece is imprisoned on a neutral square, you can more effectively attack it when it turns to the color that would give you the advantage. Another spell (called Shift Time) will reverse the flow of the luminosity cycle.

The game, which can be played by two players, or one against the computer, requires joystick(s). Usually one player uses a joystick and the other a matrix of nine direction keys and the spacebar on the keyboard. However, those who have a two joystick adapter such as the TG Switch adapter will find the game much more controllable and enjoyable.

Archon is one of the most creative and original games that has come along in several years. I'll admit that it has its roots in chess and maze/adventure type games, but it is this brilliant combination that works to make this hybrid such an outstanding strategy and combat program. I tested it on both teens and adults. Both groups, regardless of their interest or lack of interest in chess, found *Archon* a totally fascinating game. Despite its complexity, it can be quickly grasped by players of all ages. *Archon* has terrific graphics and will give you a lifetime of pleasure.

B.C.'S QUEST FOR TIRES

Sierra On-Line Systems
$34.95
48K; Apple II

Overall Rating	D	Easy	*Challenge*
Creativity	C	C-	*Graphics*
Documentation	C-	F	*Value for Money*

In this arcade game based on the comic strip B.C., you (or you and a friend) posing as Thor try to rescue Cute Chick from a dinosaur holding her captive. Unfortunately, this version translates very poorly from the original Atari version. Granted that the Apple II doesn't have anywhere near the graphics and sound capabilities of the Atari, but this game lacks the detail that made the original game interesting.

Both versions entail a scrolling field with numerous obstacles like rocks, potholes, and turtles for Thor to jump over on his stone tire unicycle. However, the Apple version skips the tree limbs that Thor had to duck and leaves out Fat Broad, who stood on the opposite end of a pond full of diving turtles, yelling, "Jump, sucker!" at Thor. Naturally, the Apple version also lacks the multi-plane scrolling, but the screen scrolls slowly and at the same speed no matter how fast Thor

moves. Although you get more points for jumping boulders at faster speeds, I didn't find it any harder. In fact, jumping seems independent of gravity in this game. You push up on the joystick and watch Thor execute a long, slow bound. The sections where you go up and down hills (if successfully negotiate the chasm) seem absolutely flat. Thor stays at the same horizontal position throughout.

I found the game boring and lacking sufficient challenge. Once you figure out how to jump the chasm and master the timing of jumping across the pond on the backs of the diving turtles, you've mastered the game. At least the Atari version has variety and comic relief provided by the expressions and actions of the cartoon characters. The Apple version has neither. Don't waste your money.

BALLBLAZER

EPYX
$40.00
64K; II/II+/IIe/IIc

Overall Rating	B-	Easy	*Challenge*
Documentation	B-	C	*Creativity*
Value for Money	B-	B-	*Graphics*

Ballblazer is a futuristic game of one-on-one soccer played on a gridded checkerboard playfield. Each player controls a Rotofoil which accelerates instantly and can hold a ball in front of it with its forcefield. The object of the game is to carry the ball within range of the other player's moving goalpost and hit it in. I guess I'd call it an update of the classic *Pong* game. One to three points are awarded depending on the distance of the shot. Players get the ball by ramming into it or by chasing it.

The split-screen display lets you see both the first and second (or computer opponent's) player's view of the action. Initially, each player can see the other's Rotofoil. When the game starts the checkerboard playfield begins scrolling and you get an amazing sense of motion. Players automatically face the ball, whether they are at its front, back, or to its side. Once you get the ball, you automatically face your own goal.

Although this game doesn't deserve all the media hype that it received during development, it's still a very intense game. What gives it credibility is that it's very polished and some people find it entertaining and challenging. As a warning, it loses something when played against the computer; mainly because the computer just isn't very good.

CATCH A HAMANTASH!!

Davka Corporation
$19.95
48K; Apple II+/IIe

Overall Rating	D	Easy	*Challenge*
Creativity	D+	C+	*Graphics*
Documentation	C	D+	*Value for Money*

In this arcade-like game, you must catch falling pastries, called hamantashen, carry them to the oven, and deposit them there to cook. If it sounds simple—it is, except that so many pastries fall at the same time that you can't keep up with the deluge. You control the man at the bottom of the screen with the arrow keys to move, any other key to stop, and the space bar to dump your load into the oven. You can only carry so much, no more than five at a time. Any more and you lose the entire load and start over. To make matters more difficult, you face a time limit of ninety-nine seconds. When time grows short, you can press the Escape key to answer questions concerning Purim and thus earn more time. The questions vary in difficulty, but they repeat. This allows you to watch for questions that you missed previously and answer them correctly the second time. Each correct answer wins you ten extra seconds, up to a maximum of ninety-nine. Incorrect answers have no penalty, so you can continue to answer questions until you have accumulated the maximum time allowed. When ready, you can return to the game section and continue filling the oven with hamantashen as you catch them.

I gave this game a rather poor rating because it neither holds your interest nor promotes learning about Purim. Within a few minutes you hit the point of wanting to do something else. You don't even have incentive to learn the correct answers because you can simply answer questions until you get the time you need to play forever.

CHOPLIFTER

Broderbund Software
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A+	Hard	*Challenge*
Creativity	A	A+	*Graphics*
Documentation	B	A+	*Value for Money*

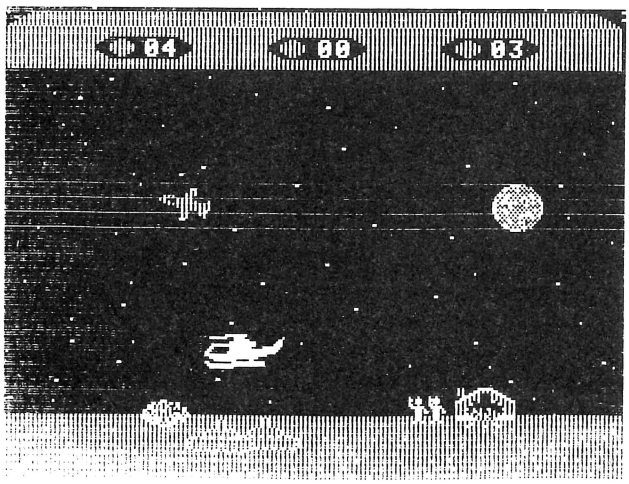
Occasionally an arcade game comes along that is so unique, so well executed, and such a joy to play that it can be considered a masterpiece. *Choplifter* is such a game. The game involves flying a helicopter into the

desert in order to rescue sixty-four hostages held in four barracks. One of the barracks has been blown open and sixteen of the prisoners are waiting patiently for your arrival. Unfortunately, tanks are patrolling the area so the hostages are reluctant to stray far from the burning barracks.

Your helicopter (there are three) is warmed up on the heliport next to the post office near the border. The helicopter responds to the up, down, and sideways movements of the joystick. Although helicopters can fly backwards in a limited fashion by pitching the direction of the rotating blades, control is provided for turning the helicopter around in order to aim its guns. Holding button one down reverses direction, and pressing it momentarily puts it into tank attack position directly facing you on the screen. The helicopter is easy to fly, and impossible to crash on level one.

It is important to set the helicopter down as near to the prisoners as possible without landing on one. The shorter their run to the copter the better, for tanks are always moving up on your position, and you often have to make a quick getaway. It is always best to destroy a tank quickly, but first lure it away from any prisoners still on the ground, for they are often killed by exploding shells.

The animation in these sequences is incredible. These prisoners actually run towards your chopper. The chopper's blades are rotating and the craft is bouncing slightly as if you were gunning the engine in anticipation of a quick takeoff. As the moving tanks lob shells closer to your craft, the exploding shells sometimes kill a running prisoner. When the prisoners are aware of your leaving, or if your chopper is full, they wave goodbye. There is detail in their motion as they run after your hovering helicopter, or as they run from an advancing tank. You'll watch in amazement as your helicopter is hit by an enemy shell just after it lifts off: it turns into a ball of fire and descends as flaming wreckage.



After rescuing as many as sixteen hostages (the copter only holds sixteen), you return to your base and the second level of the game begins. Enemy jet fighter craft guard the airspace above your advancing craft. They turn and bank sharply while firing rockets at your chopper. Sometimes it is best to maneuver into position and try to shoot them down. Just flying along is like being a sitting duck. A quick attack on a barracks usually frees another group of hostages. Rescue is more difficult at this point as missiles can still hit you from above. The only consolation at this point is that enemy aircraft stay on their side of the border. However, on level three, enemy drone air mines that are capable of homing in on your craft don't care what side of the border you're on.

The helicopter is extremely easy to fly. You do have to be more careful of your descent rate on the upper levels or you will crash the copter. The maximum score is obtained by rescuing all sixty-four prisoners. Since this is a formidable task, I would consider this a very challenging game. Overall, the concept, graphics, and animation make this a delightful game. If you are seeking something novel and a game that doesn't quickly bore you, then buy *Choplifter*!

DIG DUG

Atarisoft
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B-	Medium	*Challenge*
Creativity	C+	C+	*Graphics*
Documentation	C	C	*Value for Money*

In this arcade game a hero named Dig Dug burrows through the earth in search of monsters trapped in their own miniature tunnels. Two types of monsters can kill Dig Dug on contact: Pookas and Fygars. The latter are extremely dangerous fire-breathing creatures. Dig Dug has to time his entrance into their area and quickly pump them up by pushing the joystick button or space bar until they explode. Tackling a Fygar is very chancy, because the creature can burn our hero even from a short distance beyond the tunnel. The best bet is a side attack, which also carries more points.

Both the Fygars and the Pookas can turn into ghosts and escape from their tunnels only to reappear just behind our fleeing hero. You must wait until they metamorphosize back into their original forms, because you can't kill ghosts. Another way to kill the monsters, but one that requires careful timing, is to have Dig Dug tunnel under a boulder and let the falling rock crush the monsters as they pass. After two rocks

have fallen, a bonus fruit appears, and when you have killed all the monsters, you advance to a harder level with more monsters (sometimes two in each tunnel), a greater percentage of Fygars, and much shorter time periods for the monsters to turn into ghosts. You can reach any of these advanced levels with the Option key at the start of the game.

Dig Dug remains fairly close to the arcade version except that the screen is horizontal rather than vertical. The graphics, although good, have a little less color variation in the playfield or background. You can play using either the joystick or keyboard, but please note that there are no diagonal moves, so positioning the joystick in those directions usually results in no movement at all—a problem when being chased. Game play becomes repetitious; only the skill involved in killing the monsters varies with each level. The arcade game has a lot of devoted fans, so I'm sure the Apple version will attract the same audience.

DROL

Broderbund Software
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	B+	A	*Graphics*
Documentation	B-	A	*Value for Money*

This delightful four-level, multi-screen scrolling arcade game takes place in a dream world called Drol. An evil witch doctor has kidnapped a family consisting of a mother, two children, and their pets, a lizard and an alligator. The children, bewitched, wander zombie-like through the corridors. The little girl follows a floating balloon in the first scene and the boy follows a toy helicopter in the second. The mother, not as easily bewitched, lies tied up at the end of a long corridor on the bottom level of the third scene. Your three-stage mission consists of rescuing the girl and her pet lizard, then the boy and his pet crocodile, and finally the mother. Your character has an anti-trance suit, a jetpack for hovering, and an unlimited supply of luminous reality pellets to shoot at the witch doctor and his minions. With the jetpack you can fly through the trap doors that connect each of the four levels or floors in *Drol*'s scrolling world. A radar map at the top of the screen alerts you to the location of the moving monsters, but not the children or their pets. You must search for them.

The first mission proves relatively easy because the hopping scorpions don't shoot back and you can easily avoid the flying turkeys. However, if you're after points, five quick shots at the bird results in a turkey dinner and 500 bonus points. This is a dangerous maneuver because you must be flying to hit the bird, but any scorpions approaching from the rear must be killed at ground level. You need speed or sneakiness, popping up from a trapdoor just as the turkey flies past. You can kill enough turkeys and scorpions to amass thousands of points, but by the time you reach 4,000 points the monsters begin shooting back and an indestructible vacuum cleaner begins roaming the corridors. This makes your second mission very difficult. Try shooting the girl's balloon so that she remains stationary; otherwise, inadvertently running into her fast moving pet (he has a jetpack) advances you to the next mission.

On the second mission the witch doctor appears along with magnets that prevent you from shooting. You can remove the magnets by changing levels, but you can only shoot the witch doctor when he leaps for you. The hopping monsters appear in greater numbers here, so rescue the boy and his pet quickly on this very dangerous mission.

The third mission is definitely the hardest. Few trapdoors connect the levels, so you must proceed down long corridors filled with bouncing serpents resembling sea horses and a multitude of arrows, daggers, and twirling hatchets. This tough game is a perfect spot to lose the rest of your five men, especially if you have passed the 4,000 point mark—the monsters shoot back. You must fly high to avoid the monsters' shots, but all those arrows, daggers, and hatchets approach at all levels. If you succeed in reaching the trapdoor leading to the fourth level, beware the man-eating plants. Once you rescue the mother, a priceless cartoon rewards your success before the game repeats at a much harder level.

The exceptional graphics are smoothly animated. All of the characters are colorful, cute, and charming, and the final cartoon is a masterpiece. The game requires quite a bit of skill to master because both the pets and monsters move at variable speeds, making *Drol* rather unpredictable. You can easily miscalculate which hazard to deal with first. This first-rate arcade game possesses both charm and playability, appealing to both the novice and the skilled arcade player. The novice can attempt a quick rescue before the game becomes too difficult, while the expert can deliberately enter the difficult stage to amass points. Either way, *Drol* offers hours of entertainment.

EVOLUTION

Sydney Development Corporation
$19.95
48K; Apple II+

Overall Rating	B+	Medium	*Challenge*
Creativity	B+	B+	*Graphics*
Documentation	B	B	*Value for Money*

Evolution is an arcade game linking six distinct variations on an evolutionary theme. Starting as an amoeba, the object is to advance up the evolutionary ladder to evolve first into a tadpole, then a rodent, a beaver, a gorilla, and finally the "highest" life form, a human being. To advance from one level to the next requires instinct and quick reflexes to survive with five lives intact. What makes this game stand out from the competition is the diversity and creativity of several of the individual games developed by the two teenage programmers.

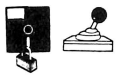
One begins as a lowly one-celled amoeba. The object is to eat all of the immobile DNA cells on the screen, while avoiding the spores, microbes, and antibodies attempting to catch you. You can move around freely by either keyboard or joystick control, but if any of your attackers touches you, you lose a life. Your only defense is to use one of your few shields. When all the DNA is eaten, you advance to the next screen, and an entirely different game. In this scenario you are a tadpole who can jump and catch the water flies hovering fleetingly overhead. The trouble is that fish moving slowly from left to right descend toward the bottom of the pond to eat you. Although the flies are unpredictable, the fish are not. Besides, if you're agile you can leapfrog over them. Fortunately, neither of the first two games are difficult—even for beginners, or you would never advance through the screens to screen five which includes some of the most intriguing levels of the game.

In screen three you are a rodent who must burrow around in a network of caves to obtain random pieces of cheese. A number of snakes hotly pursue your tasty body; they will eat you if they catch you. Although you can kill a snake by dropping one of your three dung piles, the best strategy is to dig many intersecting passageways and some cul-de-sacs as quickly as possible. This will disperse the snakes and allow you time to reach the five cheeses you need to advance to the next level. The digging portion resembles Dig Dug.

Becoming a beaver in part four holds both rewards and perils. You need to swim across an alligator-infested river to retrieve five sticks needed to complete the dam you're building. In a very simple game you dodge moving alligators. Screen five, where you become a gorilla, is the best animated of the six games. You are a rare orange gorilla who must protect the last three oranges located in the vines overhead from a swarm of thieving monkeys. The object is to hurl coconuts at the monkeys overhead and dislodge them from the vines before they steal the oranges. The simplistic theme is well animated.

The human level is a shoot-'em-up game you fight genetic mutants. Naturally, they shoot back and you must use a laser gun to dispatch ten of them to witness the end of the human race.

The game has three difficulty levels. The intermediate level, which is faster and contains more enemies, starts on level seven. The expert mode begins on level thirteen. *Evolution*'s concept is very good and provides good depth of play. The graphics are well animated and the sound effects are pleasant. I think that potential buyers will find the game fun to play. It is appealing to players of all ages, and is an arcade game of lasting value.



FAT CITY

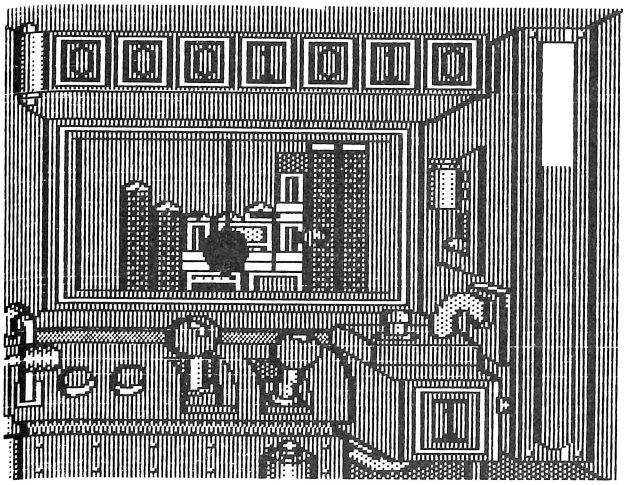
Xerox Education Publications
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C-	Easy	*Challenge*
Documentation	B	C-	*Creativity*
Value for Money	D+	B	*Graphics*

Fat City is one of the most unusual arcade games of all time. Imagine being an employee of the Fat City Wrecking Company, an operator of one of those cranes that swing heavy black wrecking balls into building walls. Yes, this is an urban renewal job, and the object is to knock down blocks of deserted buildings while avoiding large hostile rats capable of hurling bricks through your windshield.

You'll find yourself seated in the hi-res cab of a wrecking crane. Both the scrolling buildings of the target city and the swinging ball are visible through the windshield. Two guides help you aim your crane, which can move up and down and side to side. Buildings can only be demolished from the top, so striking them at the bottom is only a waste of fuel. And fuel is very important. Although a fuel depot exists somewhere behind one of the buildings, you'll have to knock those buildings down to find it. Once you have leveled a city you advance to a more difficult one. There are ten cities in all. Since your high score and last completed city are saved on disk, you can start at higher levels on subsequent levels of play.

The territorial rats are your only adversaries in this game. They defend their crumbling homes with cans,



tomatoes, and rocks, hurling them directly at your windshield. You can stop them, and earn extra points, by hitting them with the crane. Since they often work from the roofs and open windows, you should smash the roofs first, then crack the windows.

I can't say that this game is very thrilling, just different. It has good graphics and is certainly suitable for all members of the family. Its main weakness is that it isn't really much of a game. Nice try guys!

FROGGER

Sierra On-Line Systems
$14.95
48K

Overall Rating	C-	Medium	*Challenge*
Creativity	C	D	*Graphics*
Documentation	C	D	*Value for Money*

Frogger, the official translation for the Apple of the popular arcade game of the same name, pales by comparison to its namesake in the arcades and on the Atari. The object of the game is to move your frog in a limited amount of time across four lanes of traffic, then jump across a pond on the backs of diving turtles and moving logs to reach the safety of home. Moving either the joystick controller or four keyboard direction keys causes the frog to jump in any of four directions. Success is strictly a matter of timing; traffic moves in opposite directions in alternate lanes, while the turtles and logs move in opposing directions and at different speeds. When all five frogs have reached home, the game advances to a more difficult level of play, and after five levels, you are rewarded with an extra frog. In addition, escorting a lady frog home and gobbling insects results in bonuses.

While no one expected the Atari version to become such a masterpiece, this version, because of the Apple's hardware limitations, falls far short of expectations. The game's graphics and sound are disappointing in this version. In fact, it isn't even as well done as a banned competitive version called *Ribbit*. *Frogger* lacks detail. The logs are plain, and the diving turtles are likely to vanish with no warning. The frog looks like a chess pawn with a black border. Such sloppiness is inexcusable. It is not very difficult to OR the frog shape with the background if the background has been previously saved to a dummy shape table in memory. The sound is limited to several beeps and sorely lacks the *Frogger* theme music except during boot up. Consider, for instance, the maze game *Microwave*, which plays music throughout the game.

Frogger is an addictive yet simplistic game, especially designed for children. Unfortunately, much of the appeal of the original game lay in its graphics and music; the charm of these elements completely disappears from this dull and mediocre Apple version.

GATO

Spectrum Holobyte
$39.95
128K; IIe/IIc

Overall Rating	B	Medium	*Challenge*
Documentation	B	C+	*Creativity*
Value for Money	B-	C	*Graphics*

Gato puts you in control of a World War II combat submarine in this arcade-style computer simulation. You pilot your submarine on a search and destroy mission against enemy Japanese vessels supplying their South Pacific bases.

The game is an accurate simulation of a real *Gato* class submarine. You receive orders from the main control screen. Most of the commands are keyboarded, with the joystick used only for steering and depth control. The screen shows either the surface or periscopic view on the top half of the screen, and an instrument panel with depth, speed, and heading gauges below. Additional indicators show battery charge, oxygen left, number of torpedoes, damage level, and power mode.

Your craft usually runs on diesel power, but requires battery power below twenty feet. In addition, a chart in the screen accurately plots your course and all other ships in the twenty patrol sectors. An enlarged quadrant chart can be displayed for greater accuracy. Radar can help you locate enemy ships below the horizon. Unfortunately, the radar scan is so slow (fifteen to twenty seconds) that you can't depend on it. While visual approach is dangerous, it is easier and quicker.

Once you locate and have your target within torpedo range, you open the torpedo doors and fire off one or more torpedos. If you give them the right amount of lead to account for the time delay you can watch your target sink. Be careful when destroyers or patrol boats accompany your target—you'd better either sink that ship or dive deep and hope that he doesn't find you with his sonar and get you with a depth charge. If you're hit you can get a special view of your sub with the damaged area highlighted. There is little you can do with a crippled ship but try to return to your sub tender for repairs.

The display portions of the game are detailed and accurate. Islands and ships are only vector or line drawings that show the object's outline. Explosions are slow, random lines indicating the blast as the ship's outline slowly vanishes. Graphics are updated about once a second, indicating that the game is in BASIC or compiled. These are graphics I expected three or four years ago and are very poor by today's standards. The programmers have included a "spreadsheet" for you to pop onto the screen if you're playing at the office.

Surprisingly, many people who like simulations also like this game, presumably because it plods along at the pace that war gamers prefer. These are probably the same players who abhor the Rapid Submarine Deployment key because it allows you reach your destination instantaneously. Unfortunately, you can't use it when the enemy is depth-charging you.

Overall, *Gato* is a good simulation, though I doubt it will appeal to anyone expecting an arcade style game; it's much too slow. Frankly, compared to the other submarine simulations I've seen, this just doesn't cut it.

GHOSTBUSTERS

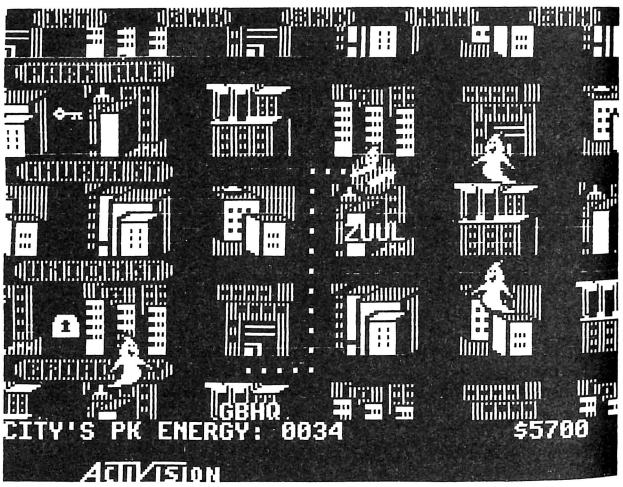
Activision
$31.95
48K; II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Documentation	C-	B-	*Creativity*
Value for Money	B-	C+	*Graphics*

Activision has taken *Ghostbusters*, the biggest movie comedy box office hit of the decade, and turned it into a video game that's destined to be a hit. They've created an entertainment program that retains the basic ghost hunting flavor of the movie. Unfortunately, the Apple's lack of a good sound chip makes this version pale compared to the Commodore version which combines good music and amusing sound/speech effects throughout the game.

The object of the game is to set up your own "Ghostbusters franchise" in your neighborhood. The bank loans you $10,000 to buy a vehicle and equip it with important ghost hunting tools, such as a PK energy detector, marshmallow sensor, portable laser confinement system, ghost vacuum, traps, and bait. The more expensive cars go faster and hold more equipment, but they are usually beyond your budget. Most players settle for a 1963 hearse or a VW Beetle, unless they have accumulated money from previous games. You load your ghostbusting equipment onto your car with a forklift. Be sure you purchase the right items, for you can't put things back once you've loaded them onto your vehicle.

Your neighborhood is shown on the map as a grid of streets with various buildings depicted, such as your headquarters and the temple of Zuul. Ghosts slowly stream toward Zuul's temple, some stopping to haunt other buildings along the way. Your PK energy indicator creeps upward. When a building flashes red, you guide your vehicle along the shortest trail to it. The screen shifts to an overhead view of the road as you drive. You can steer side to side, vacuuming up passing ghosts (roamers) as you go (assuming you bought a ghost vacuum). This requires little skill, but the sight of ghosts being sucked into the Ghostbusters decal on the top of the car is adorable.



You arrive at the site of the disturbance to find a ghost wandering in and out of the upper windows. Direct the first Ghostbuster in your team toward the center of the building to place a trap. Then you move him to the far left side of the screen, turn him around toward the trap, where he waits while you position the second member of the team at the far right. When the ghost moves into range, you power on their negative ionizer backpacks, slowly directing the streams inward (but *never* crossing) in an attempt to catch the slimer directly above the trap. Once it is above it, you release the streams and the trap opens like a jack-in-the-box,

jumps up, and grabs the slimer. If you're successful, you earn the $300 fee. But, if you miss, one of your men gets slimed and the city's PK energy level increases by 300.

The scene is just like in the film, where the Busters are warned not to cross the streams. Again, not much skill is required here. The beams are set inward at an angle, and you can only move them inward, hopefully toward the ghost, if it hasn't already escaped up and out of the range of the beams. The ghosts are dumb, however, and will wander back within range if you don't run out of energy first (in which case, you automatically get slimed). Capturing one is just a matter of timing: you must release the button when the ghost is directly above the trap. You can capture it regardless of whether your beams are in exactly the right postion or not. When all your traps are full, you return to headquarters.

When the PK energy level gets danerously high, a "Marshmallow Alert" flashes on the bottom of your screen. Roamers are roaming about; they mass together to form a Marshmallow Man. M. Man does from four to five thousand dollars worth of damage to the city, which is charged against your account. Sometimes, you can stop him by dropping bait (using the B key).

The Gatekeeper and Keymaster begin wandering the streets as the PK energy level nears 10,000 units. There doesn't seem to be anything you can do about this; chalk it all up to fate. However, the instructions do hint that you can sneak two of your Ghostbusters into the entrance and reach the top of the Temple of Zuul. I have tried in vain, but nothing ever happens. The first Ghostbuster just picks up his trap and leaves because Zuul's building wasn't flashing red (the sign of a haunted building).

The game usually ends in a frustrating, seemingly uncontrollable way. The Gatekeeper and Keymaster join forces, and as usual, you do not have more money than you started with (a pre-requisite for winning the game). Sooner or later, you will stop Marshmallow Man and earn your just rewards.

Ghostbusters is an entertaining game, that probably will appeal to movie and game fans of all ages. The great music, sound effects, and cute ghost capture scenes outweigh the game's average playability and repetitiveness. *Ghostbusters* provides the fantasy that players crave; it will invariably sell like hot cakes, regardless of its drawbacks.

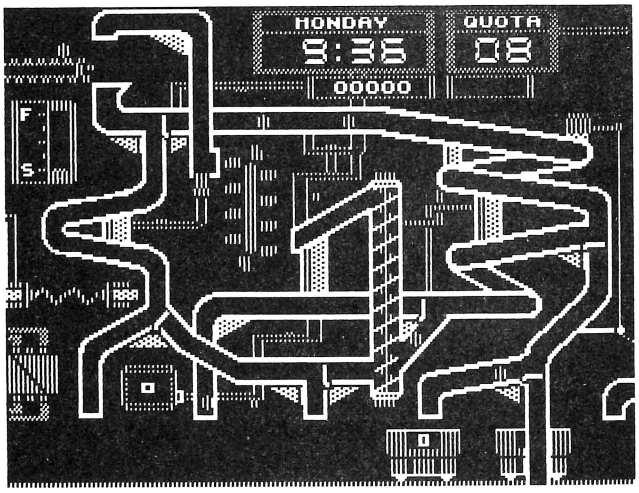
GUMBALL

Broderbund Software
$29.95
48K; II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Documentation	B	C+	*Creativity*
Value for Money	C	C+	*Graphics*

Games sometimes mirror real life. Although sorting gumballs all day as a blue collar factory worker probably isn't your fantasy, *Gumball* gives you the chance to try it without having to pay union dues. You sort a steady stream of gumballs by color, guiding them into the correct bin. To control each gumball's path, you open the closing series of mechanical gates in a huge Rube Goldberg contraption. You also control the bin's placement below with a paddle or joystick.

Of course, you must meet your quota each eight-hour shift, so you send your partially filled bins to the shipping area at the right side of the screen. The quota changes, depending on how many gumballs you miss, and quality control is rigidly enforced. If a gumball falls in the wrong container, Mr. Nitpicker comes out, shakes his fist at you, and tips over the bin while you stand helplessly by. When the gumball machine sends out rotten, speckled gumballs, you must send them through the drop chute at the bottom right. However, if you send them anywhere, ten times the level number will be deducted from your score.



Level one is easy. Two gumball colors go into two containers. You'll easily meet your quota and get promoted to foreman. On the second level, with three colors and containers, the going gets rough. Pretty soon you have the wrong gates open as gumballs flow all through the machine. Send one down the wrong path, and you have to scurry to move the right color bin below that chute before Mr. Nitpicker comes out.

If you're really good and get through the four gumball colors on level three, level four presents a serious

problem. Over-zealous dental assistants (terrorists in any other game) planted dynamite in the sugar supply, in an attempt to blow up the factory. When their "gumball bombs" enter the production line, a warning siren sounds. You have a limited amount of time to deactivate them with the bomb deactivating cross-hairs. The space bar turns them on in the joystick mode (software pirates will have to guess the key in the keyboard mode). Aligning the cross-hairs on the bomb defuses it. Once you've turned the production line back on, you still have to meet your quota.

Gumball has smoothly implemented sound and graphics. It's difficult, requiring intense concentration and timing skills, but isn't especially captivating. I guess you could think of it as masochistic fun.

H.E.R.O.

Activision
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Documentation	C	C	*Creativity*
Value for Money	C	C	*Graphics*

Kids, having a basic need for superheroes, usually turn to the pulp comics and the Saturday morning cartoon shows. Activision, in an attempt to fill this need, invented their own paragon of virtue, named, Roderick H.E.R.O. Unfortunately, this superhero remains one-dimensional, and totally lacking in character and feeling. Children perceive him as merely a man who shoots laser beams from his helmet and flies with the aid of a backpack.

His mission is to rescue miners trapped in a lava mine. The mine shafts extend both vertically and horizontally with many dead-end passages. R. H.E.R.O. carries a supply of dynamite to blast open some of the narrower passages. He merely has to push the stick downward (to place it against a wall) and light the fuse. If he is quick to move aside, the blast will open the passage. The shafts are alive with bats, spiders, and nesting snakes. These can be blasted away with the laser or merely avoided. Lanterns light the various passageways. You must maneuver slowly as you descend, and be careful not to break a lantern. Dark passageways are treacherous and difficult to traverse, since you can't tell which blocked walls are too thick to blast open. Once you reach the first trapped miner, you descend even deeper to find the next. Soon the mine walls become lethal and glow from the heat. Somewhere near the bottom are lava rivers that can only be crossed on heat-resistant rafts.

The majority of hazards (like the spider and bat) offer you little challenge. You have to be extremely uncoordinated to die from a dynamite blast. However, the control system, which requires a very light touch, results in your doom more than you would like—particularly after level eight, when contact with the walls becomes a factor. The control system doesn't react as one would expect; perhaps there is too much lag or delay for the controls to respond properly.

H.E.R.O. does have very pleasing and colorful graphics, though not as detailed as Activision's other recent offerings. Game play is somewhat repetitious, but children enjoy the quest even if the game isn't that much different from other rescue games. While the first levels aren't much of a challenge, upper levels are, especially if you haven't mastered the art of hovering. Lower levels can be skipped. While *H.E.R.O.* lacks the charm and strong leading character necessary to make it into a classic, it still is a pleasant game.

HIGH RISE

Micro Lab
$35.00
48K; Apple II/II+/IIe/IIc

Overall Rating	B-	Hard	*Challenge*
Creativity	C+	C+	*Graphics*
Documentation	C-	B-	*Value for Money*

In our childhood days, many of us delighted in stacking different shaped blocks to form a high tower. The object was to see how high we could pile the blocks until the tower fell over. The concept of *High Rise* is similar, but the game has become computerized and the shapes of the blocks have become complex.

High Rise is a keyboard controlled game. A man chooses the bottom block from five columns. He takes the block and positions it in one of six positions on the springboard. He can put more than one block on the springboard at once. Pressing the Return key launches the blocks on top of the pile on the far left. In all cases, the stack must remain stable or it will fall over. Thus, the center of gravity of any block must be distributed over the blocks beneath it or be supported at the ends. When the column reaches the arrow, the man climbs up to a harder level. The amount of points awarded is based on the time remaining on the clock.

The complexity of the game increases with each level. The pieces are nice, solid shapes on the first level, but become more geometric as the game progresses. One of the difficulties is that there are only five different sized pieces to chose from. It requires thought in how to arrange them on the springboard so that per-

haps only two different towers are built simultaneously. I did find a trick. If a block is on the right end of the springboard, signifying that no other piece can be added, and you don't launch it right away, any piece you take from the column will fall through the floor. This is a handy method for getting rid of your useless pieces.

The game, while appearing simplistic and childish, can become addicting. The game is a geometric puzzle that many adults find fascinating. Yet the pace is slow enough on easier levels to absorb the interests of children as well.

IMPOSSIBLE MISSION

EPYX
$31.00
48K; II/II+/IIe/IIc

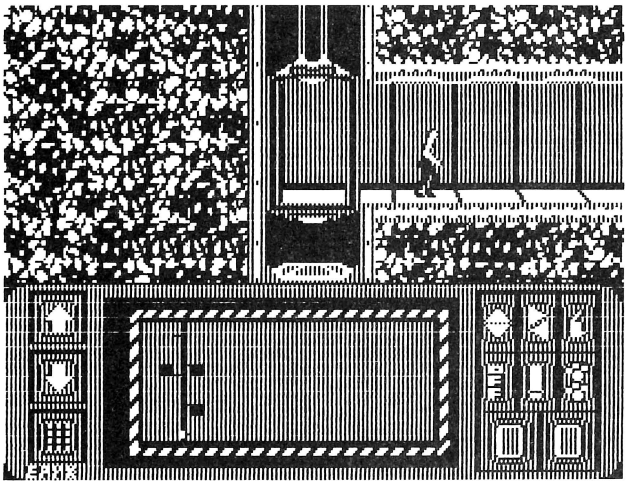
Overall Rating	A-	Hard	*Challenge*
Documentation	B	B	*Creativity*
Value for Money	B+	B+	*Graphics*

In *Impossible Mission* you, as Special Agent 4125, must penetrate Elvin Atombender's underground stronghold and stop him from blowing up the world. This is no simple task: you must evade the mad scientist's robot guards, find hidden clues for breaking his security code, find his secret control room, and deactivate the doomsday computer before your time runs out. If this sounds like your kind of adventure, read on.

The labyrinthine underground complex, which is serviced by elevators, leads to the professor's living quarters and computer rooms. Each of the thrity-two rooms is peculiarly constructed so that only Elvin can negotiate them easily. All the furniture is suspended on catwalks or sitting on floors that end abruptly. One wrong step, and you may find yourself plunging headlong into the abysss. Elvin's robots patrol the catwalks, which are connected by a series of lifts.

You can find the passwords that absent-minded Elvin hid in the furniture (of all places!). Some deactivate the robots, others reset the lifts when you feed them into any of the terminals within a room. However, the control room's password is much more involved. It is broken up into small pieces: you match up four using your pocket computer to maneuver and flip pieces. The solution reveals one of the nine letters you need to enter the security room.

Success in this game requires a considerable amount of joystick dexterity. You have to leap across gaps and perfectly time your somersaults over the robots. While you have an unlimited number of lives, each loss costs you ten minutes of game time—and you have only six hours to stop Elvin. You can call the Agency's main computer for help with the phone on your pocket computer. The computer's clues cost you two minutes of precious time each.



Impossible Mission's scenario is excellent, albeit difficult. There are no easy levels for beginners, and none of the teenaged gamesters in my neighborhood have even come close to winning. The graphics are excellent.

Impossible Mission should hold your interest game after game. Hopefully, its high level of difficulty will neither frustrate the average player, nor spoil his enjoyment.

MICROBE

Synergistic Software
$44.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	A	A	*Graphics*
Documentation	C	B	*Value for Money*

Microbe is a colorful Hi-Res game based heavily on the movie *Fantastic Voyage*. You are the commander of a four man micro miniaturized submarine designed to perform otherwise inoperable surgical procedures. You are injected into a patient's leg vein and must navigate through the body's blood vessels to the interior of an injured brain. To put it mildly, the interior of the human body turns out to be a most inhospitable place.

There are a multiplicity of available patients, each with different problems lying deep within the brain. Three levels of difficulty are provided by controlling the physician's capabilities and by adding to the already busy technician's work load. Further, each

patient has varying allergy and pre-existing problems, all designed to further complicate an already difficult trip. Hitting tissue walls or blood cells can damage your fragile ship and its contents, and injure or kill vitally needed crewmembers.

A single saved-game may be put on the protected disk, but only when you decide to (Q)uit the game. Recall is permitted only in the boot cycle. Even so, frequent saves are recommended after successful "hook-ups" in the major organs, before defibrillating the heart, and at all major arterial branches. The chances for ship and crew damage increase materially as you near your objective, where veins get much smaller, and manuvering gets tricky, especially just before escaping to the rather sudden and abrupt ending.

Microbe is billed as an educational experience as well as a game. Perhaps so, for medical students who have time for games, but not for laymen. The Physician's Reference is heavy on polysyllabic names of immunogens, bacteria, parasites, viruses, fungi, drugs and medical supplies. Some are even complete with meaningless abbreviations and initials, but there is not a hint or explanation on any of these "things" in layman language.

This is a minor shortcoming of the seemingly complete and extensive documentation, for the average user can use "magic words" from a look-up table as well as the next guy. More disturbing are the omissions of the (I)nventory and (?) commands, the latter providing a full list of usable commands. Also, there is no discription of the vitally important need to refill fuel and oxygen tanks, (U)se 1 or 2 (Return), and there are significant differences between the heart's and lung's on-screen appearance with that of the documentation.

The graphics quality and control responsiveness combine with the facinating theme to more than compensate for these difficulties. Indeed, *Microbe* has something to offer a wide range of age and interest groups, even a crazy maze in the lungs. After getting the feel of this game, its challenge will lure you back for more.

MINIT MAN

Penguin Software
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	Hard	*Challenge*
Creativity	C+	A	*Graphics*
Documentation	B	A	*Value for Money*

In this arcade game your task is to construct a bridge across a gorge in time for a locomotive towing three missiles to your new missile complex to pass safely. With a joystick, you control an easily flown double-rotor helicopter crane. The airship, equipped with cannons, must also contend with attacking robots and laser guns guarding the approaches to the bridge and the supply yard. One button turns the ship, another fires the cannon, and both pressed simultaneously pick up and drop parts.

The action takes place on three separate screens. You maneuver the ship to the far right screen where girders and trusses are stored. Once you have descended low enough to pick up a part, pressing both joystick buttons lowers the electromagnetic winch, which latches onto the piece with a beep. Although the laser above the storage area offers little threat, the one guarding the approach to the bridge on the far left screen will shoot you down unless you temporarily disable it. You need to do this in order to maneuver the helicopter into the exact position to place the girder or truss part. If you don't align the part properly, it will fall into the chasm when you release it.

The center screen contains the command center. When you have completed the bridge, you land on the roof, climb out of your helicopter, and descend to the control room to launch your two missiles. The game might sound simple, but the marauding robots in the command center not only shoot at you and crash into your I-beams, they also try to infiltrate your command center. You must always keep on the lookout for robots slowly making their way through the corridors of the five-story building. Fortunately, you can shoot through the slots in the walls (upper floors only). Unfortunately, you cannot kill the robots easily. They mutate to other forms when hit until the third hit, when they vaporize, leaving behind a land mine. Sometimes following robots get blown up by the mine. Of course, you can land on the roof and pursue the robots down the corridors, but you can easily lose several of your men in a fire fight. Your man can duck to avoid enemy fire, or jump over mines.

Minit Man has a good concept and excellent graphics. Despite the substantial challenge, however, game play seems a bit slow and not all that exciting. Unfortunately, the game doesn't scroll; this results in an annoying pause between screens. Still, *Minit Man* is one of the better games from Penguin Software and a good value for the money.

O'RILEY'S MINE

Datasoft
$29.95
48K

Overall Rating	D+	Easy	*Challenge*
Creativity	D+	D+	*Graphics*
Documentation	C	F	*Value for Money*

In this simple, slow-paced treasure hunt, you steer your miner around the screen as he digs tunnels to reach the various mineral deposits buried in the earth. One problem: the tunnels gradually fill up with water. In addition, monsters dog your every move. You can't shoot them, but you can set a dynamite charge to block their way.

Collecting all of the diamond, ruby, coal, uranium, and oil deposits requires planning and strategy. As the water reaches the highest levels of your tunnels, you must reach all of the low-lying treasure on both sides of the main shaft. You must work quickly, because your dynamite induced cave-ins won't stop the water from rising. If you mistakenly dig too high, the water in the main shaft will rise to block your escape. The game has progressively harder levels, with more monsters and treasures, and you can't exit the mine until you recover all of the treasure.

The graphics are simple but colorful. Although the game has little depth, its random placement of treasures and fast pace will keep you thinking. Despite its simplicity, it might be worth looking at—but not at $29.95.

OIL'S WELL

Sierra On-Line Systems
$14.95
48K; II/II+/IIe/IIc

Overall Rating	B-	medium	*Challenge*
Creativity	B-	C	*Graphics*
Documentation	C	C	*Value for Money*

Oil's Well provides an interesting and addicting variation of an eat-the-dots maze game. Using a joystick you control a drilling rig on top of a maze of passageways containing droplets of oil. The oil pipe, equipped with a drill bit resembling teeth, extends from the platform like a long snake as you guide it deeper and deeper into the maze. Pressing the joystick button retracts the drill partially or completely. You need this retractability to counter pipe-eating Oozies that wander the corridors. You can eat an Oozie by attacking it head on, but if one approaches your pipe from the side, you must retract the pipe before the Oozie touches it. The game thus becomes one of cat and mouse, with you trying to reach the deepest oil reserves without letting an Oozie attack your pipe. One vitamin pill, buried deep in the maze, will temporarily slow down the Oozies if you can reach it. You also need to watch out for occasional bombs. Once you successfully mine all the oil, you advance to a faster level.

Despite the simplicity, lack of depth, and mediocre graphics, I found the game fascinating to play. You compete against the Oozies in drilling for oil and must be quick to survive. It seems all your fault if you lose. If you can just play again, you'll win. It becomes addictive. In fact, my only complaint about this translation from the Atari version is that joystick control seems a bit sluggish on diagonals when you want to turn downwards.

PITFALL

Activision
$31.95
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Documentation	A	A	*Creativity*
Value for Money	A	A	*Graphics*

Pitfall is an imaginative treasure-hunting adventure done with arcade-style play. Pitfall Harry's mission is to travel safely through the jungle collecting the "Lost Treasures of Enarc" within an allotted amount of time. There are dangers in nearly every screen. Some, like scorpions, rolling logs, snakes, and alligators, are visible, while others, like quicksand, and vanishing pits, appear with time or are triggered when stepped on. Most of these hazards are deadly. Fortunately, Harry has three lives.

Despite the nearly two hundred different rooms, there are only seven basic scenes. The others are merely combinations. Different dangers or treasures appear within the same scene. The graphics and animation in each scene are excellent with a lot of detail and color.

The game requires considerable skill to master. Harry has to do a lot of running, jumping, and swinging on vines to avoid many of the game's dangers. For example, the use of a swinging vine may be the easiest method to bypass a pool of quicksand or one full of alligators. Without the vine, Harry's timing must be perfect to jump across the backs of three alligators without being eaten. There are numerous rolling barrels in this game so it pays to run from right to left to avoid having to jump them. Many of the screens also contain ladders leading to underground tunnels, some

of which bypass several surface screens and save you a lot of valuable time. It requires precise timing, however, to jump over the scorpions lurking in these handy tunnels.

Pitfall is a great game. It is very addicting and never becomes boring. The game isn't easy, and novices will have trouble until they become adept at avoiding the obstacles. Since it is an adventure game, *Pitfall* should be mapped, but I'm sure that most kids will just memorize the entire layout after conquering it room by room. *Pitfall* is worth the money.

S.C.I.M.M.A.R.S.

Avalon Hill Microcomputer Games
$26.00
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Creativity	B	A	*Graphics*
Documentation	B	B-	*Value for Money*

S.C.I.M.M.A.R.S. is an interesting arcade game that involves you in a gladiatorial contest against your computer. In this game you are in control of a S.C.I.M.-M.A.R., a fast, armored ground car equipped with cannons. You maneuver around the vast plains of the planet Trulgren, trying to hit your opponent with cannon fire. Successful shots will eventually penetrate the opposing S.C.I.M.M.A.R.'s armor, destroying the vital systems inside in a fiery explosion. This is not a game where you slaughter a mass of aliens. Good shots will be few and far between. If you make a mistake, you can bet the computer will take advantage of it.

The computer display places you in the seat of your S.C.I.M.M.A.R., looking out the front of the ship. Your radar and rear-view mirror help you spot the enemy, while warning lights assist you in controlling the various systems: armor, cannons, thrusters, etc. Once you begin play, you control everything with the joystick. You can pause by hitting the Escape key, just one of the many unique features of this arcade game. In many ways, *S.C.I.M.M.A.R.S.* is similar to the popular "Tank" games, only much faster.

Without a doubt, the program runs superbly. The outstanding color graphics scroll smoothly, and small details like exploding volcanos, a blazing sun, and stars on the horizon add to the quality of this program. You'll almost lean with your ship as you reverse thrust to catch a fleeing opponent. If a section of your ship is damaged, the computer will adjust play accordingly. Thus, if you lose a thruster, you'll be able to turn in only one direction. When you finally destroy the other S.C.I.M.-M.A.R., a spectacular fireball will appear on the screen. In addition, the copy-protected disk seems to be error-proof. No function I performed on this program resulted in the crashing of the entire program.

My sole complaint about *S.C.I.M.M.A.R.S.* is its limited scope. It has only eight levels of play, differentiated by relative armor strength. As your armor strength is reduced, your opponent becomes stronger and harder to destroy. Admittedly, the higher strength levels make the game very challenging. I'm just not sure you'll want to come back to the game frequently to achieve those levels. This is especially true when you think about what could have been included: combat against a different type of ship, two against one combat, etc. On the other hand, the program is excellent within its limited scope. This game gets your computer to do so much that you may be interested in it for just that reason.

SPARE CHANGE

Broderbund Software
$34.95
48K; Apple IIc

Overall Rating	B	Medium	*Challenge*
Creativity	A	B	*Graphics*
Documentation	B-	B-	*Value for Money*

Two fun-loving Zerks have escaped from their game machine in this madcap romp through the local arcade. The object in *Spare Change* is to fill up the token bin with enough tokens to see one of the slapstick cartoons in the Zerk Show. The problem is that you must simultaneously keep the Zerks from collecting 5 tokens in their piggy bank as you collect your tokens or you lose the game.

The arcade runs on a token economy. There are four token machines and you have to race from token dispenser to your bin and back again. Speed is essential, as the Zerks are also collecting tokens. The playful Zerks stomp around for awhile and even toss the token back and forth between them before flipping it into the piggy bank. This gives you a good chance for an interception. Sometimes they even miss.

The token machines require money, which you must get from the cash register. If the cash register is emptied, you need to get money out of the safe. Even some of the token machines will run "Out" and need to be restocked. With all this running around, combined with the Zerks knack of stealing from your pile, the game becomes frantic.

Lucky for you, the Zerks are easily distracted. These toe-tapping creatures can't resist dancing deliriously if

you start up the jukebox. This keeps them occupied while you gather a few more tokens. The popcorn machine and the pay telephone are other means to distract them on some of the upper levels. They are incurable gabbers.

You have to prevent those Zerks from filling their bank. If it looks like they are about to win and you have at least ten tokens saved in your bin, you can sacrifice seeing the cartoon by entering the Zerk Show Door. You won't see the show, but everyone loses his stash, including the Zerks.

The game is either joystick or keyboard controlled. A joystick is almost necessary, especially for the kids who are most likely to take this game to heart. The game can be adjusted in difficulty by altering up to seven characteristics of the Zerk's behavior patterns. Thus, the game can be made quite easy for a seven year old or incredibly challenging for a seasoned teen.

Spare Change is a light and humorous game with great animation and zany characters. It is likely to amuse the younger set because it is cute, different, and full of surprises. There is a slapstick cartoon reward at every level featuring, you guessed it, those two zany Zerks, Ozzie and Zeke. The kids will play this game until they have seen all of the cartoons. *Spare Change* is pure entertainment.

SPY VS. SPY

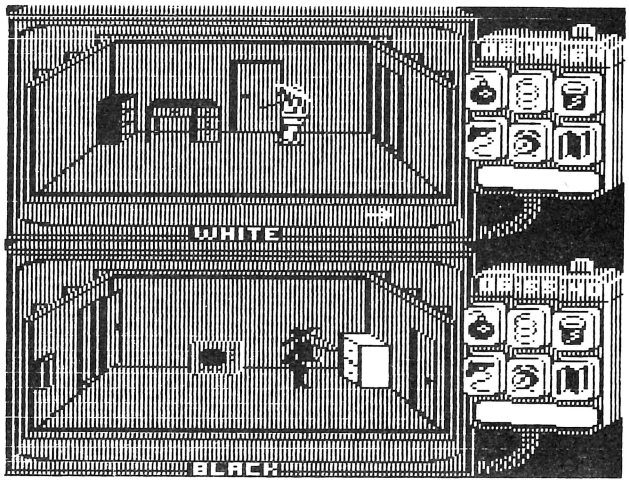
First Star Software
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Documentation	B	A-	*Creativity*
Value for Money	A	B+	*Graphics*

Mad Magazine fans will recall the zany cartoon strip about two needle-faced secret agents in contrasting black and white spy suits who, month after month, execute convoluted plots to get the upper hand at the other's expense. *Spy vs. Spy* is now a computer arcade game for one or two players that recreates the antics of Antonio Prohias's characters.

The object is to escape the embassy in time to board a plane waiting at the airport. To do this you must have in hand your passport, travelling money, keys, and briefcase filled with the secret plans. This may sound simple, but your counterpart, played by either the computer or another player, is out to eliminate you with a carefully set trap. Of course no one dies in cartoons, and this game is no exception. You are only penalized precious time.

The display is a split screen (First Star calls it Simulvision). The top screen is used when the two spies are in the same room, but the display splits when the two players are in separate rooms so that each player can go about their searching and trap setting simultaneously. What is fun here is that your opponent can disarm your traps if he can remember what they are and where you set them, a feat of memory that is somewhat difficult when you are busy searching and setting traps yourself.



To the right of each player's screen is a trapulator, a calculator-like device. It can be accessed by pressing the joystick button twice, or the Q key if there is a second player using the keyboard. There is a countdown timer at the top and an inventory window at the bottom with six icon buttons. Five of these buttons set traps and the last summons a map of the embassy. You choose a trap—maybe a bomb, or a gun with a string, or a spring—then place it somewhere in the room. You're penalized time for each trap set. All traps, except the fifteen-second time bomb, have remedies. The remedies have particular locations, but they are portable. For example, the gun with a string can be disarmed by a scissors located in the first aid kit on the back wall; similarly, the bomb can be disarmed with a bucket of water; and the water bucket over the door (to electrocute the opposing spy) can be remedied using an umbrella. In homage to the comic strip, one spy laughs hysterically when the other is caught by a trap.

The easiest levels feature a single-story embassy of six rooms. Advanced levels feature a two-story, nine-room embassy. The second story can be reached by a ladder and descended from through a hole in the floor beneath a rug. Both levels keep their airport exit door hidden until one spy has all of the required items in his possession; this prevents the losing spy from standing by the door in hopes of killing off the winning spy and escaping with the required material. If one spy is killed during hand-to-hand combat, his items are lost and

hidden somewhere in the room. The winner can search for and recover the objects. This also happens whenever both spies enter a common room.

Spy vs. Spy is a very competitive game, one of the better two-player games that I've seen in a long time. It is best to play against another player, because the computer opponent is much too tough on beginners. The graphics in the game are quite good and colorful. They are very appropriate to the tongue-in-cheek tone of the original comic strip. *Spy vs. Spy* is a good arcade game that will hold most players' interest for some time. Being more of a strategy contest than a straight action game, it should appeal to a much wider audience.

STICKYBEAR BASKETBOUNCE

Xerox Education Publications
Weekly Reader Computer Software Division
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	D	Easy	*Challenge*
Creativity	D	C-	*Graphics*
Documentation	C	D-	*Value for Money*

Stickybear Basketbounce is a simplistic arcade game for the entire family. Obviously designed for young children, it includes no shooting or violence of any kind. The cute, colorful, oversized graphics feature a bear named Sticky. You try to position Sticky, who holds a basket, so that falling bricks, donuts, and stars land directly in his basket or bounce into it. When he has caught all of the objects, you advance to the next level.

This game has all the excitement of a bowl of cold porridge. Boredom should immediately set in among children older than six. The graphics don't look nearly as good as those in earlier Stickybear programs which, although simple, were at least fun to play. This game costs about four times what it should.

SUPER TAXMAN 2

H.A.L. Labs
$20.00
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	B+	Medium	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	C	B+	*Value for Money*

It is obvious that *PacMan* fever has not subsided at H.A.L Labs. They have taken their popular clone version, upgraded and changed it somewhat, made our little round friend a tax collector and the ghost angry citizens, and produced a new version called *Super Taxman 2*. This eat-the-dots version for one or two alternating players incorporates a choice of four much larger and interesting mazes that have six power dots rather than the usual four. You have a choice of ninety-nine levels of play that progress in speed and difficulty. Every third level is an ultrafast "challenging stage." Five different cartoons provide a nice intermission between levels. An option allows these cartoons to be viewed before the game.

The primary control system is by keyboard, unless owners have purchased a "gizmo" for $10 from H.A.L Labs that will enable them to interface an Atari style joystick. Unfortunately, this unit is not Joyport compatible. Apple type joysticks don't work either. The player's only consolation is that the keyboard direction control keys are user definable.

If you like the PacMan style game, you'll like *Super Taxman 2*. The graphics are smooth and flicker free. It works well on either a B&W or color monitor, and now has music in addition to sound effects. The game is a definite improvement over *Taxman*. Now, if this version could only use a regular joystick...

TAPPER

Sega
$44.95
48K; II/II+/IIe/IIc

Overall Rating	B+	Hard	*Challenge*
Documentation	B+	A-	*Creativity*
Value for Money	B-	B	*Graphics*

Tapper was adapted from the novel, madcap, coin-operated game of the same name by Bally Midway. you play an overworked bartender slinging sodas (the original has sudsy beers) to customers in an old west saloon. In the first screen, customers line up at each of four separate bars. you fill mugs from taps located on the left, then sling them across the bar to the patrons. The joystick or keyboard controls your vertical movement between bars, and sideways movement from bar to taps. you must be quick, since your customers get impatient and move toward you. If a disgruntled customer reaches you before you serve him, he slings you down the bar. Some drinkers take their sodas and leave, only to be replaced by new customers. Others gulp their drinks and sling their empty mugs back at you. You lose a life if a mug crashes to the ground, or you slide a soda to a customer who's still drinking or

watching the floor show. These things don't happen until you pick up tips left by happy customers.

At first, only one customer stands at each bar. The second round has two per bar; things begin to get hectic. If you survive, you advance to the bonus round. The infamous "soda bandit" shakes five of the six Mountain Dew soda cans, then shuffles them like a con man's shell game. When he stops, you must guess which one he didn't shake. The correct guess earns you 3000 points.

Tapper has three other bar scenes: the Jock Bar, Punk Bar, and Space Bar. While all the taps in both the Old West Saloon and the Jock Bar are on one side or the other, the Punk and Space bars split them up. The Punk Bar has two taps at the bottom right and two more at the top left. You get from one to the other through a passageway between the second and third bars. The split is even worse in the Space bar. Unfortunately, you have to play the screens in order. I've never reached the last two.

Tapper is a zany, fun-filled game with great graphics. It is certainly an original concept, and holds your interest for some time. One player can sling the suds alone, or two can alternate turns.

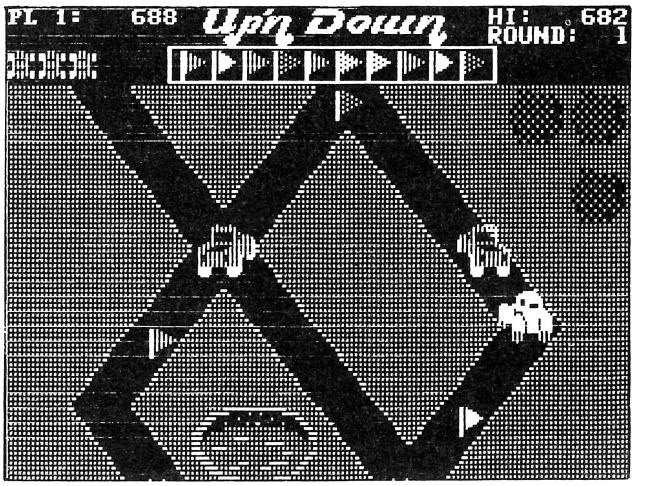
UP 'N DOWN

SEGA
$35.00
48K; II/II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Documentation	C	C	*Creativity*
Value for Money	C-	C	*Graphics*

Up 'n Down is a translation of an obscure Bally-Midway arcade game. The object is to race your joystick controlled Baja Buggy over a series of vertically scrolling, criss-crossing roads that often undulate up and down steep hills. You earn points by collecting flags and other prizes along the course while avoiding the pickup trucks, flag cars, tanks, and toasters that are intent on colliding with you.

Driving is mostly forward, although you can roll slowly backward if you decrease your speed to zero. (This is useful only if you have missed a turnoff and need to back up, assuming that an enemy vehicle is approaching from behind.) Normally, you can jump to avoid an approaching enemy, but you cannot jump while rolling backward. In fact, the only defense you have against all these opponents is to carefully time your jumps so you land on top of the baddies as you hit the pavement. You must also be careful not to jump near a turn and subsequently land off the road. There are a few spots where you can jump from one zigzag track to another if your timing is perfect and you are moving fast enough. The hills are the tricky parts, for if you don't give it enough gas, you will stall and drift backward, often into an approaching enemy. When you have collected all ten colored flags, the game progresses to a more difficult level.



Game play is a little shallow and repetitive, but it does not detract much from an enjoyable amusement that requires little thought. The graphics are decent. *Up 'n Down* is an appealing game that really is more suited to younger preteens than adults.

Shoot-'em-up

A.E.

Broderbund Software
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Creativity	C	A-	*Graphics*
Documentation	C	B-	*Value for Money*

A.E. (Japanese for stingray) is a shoot-'em-up game in which the objective is to chase out-of-control pollution-control robots from the city to the farthest reaches of the galaxy. As in most games of this type, your adversaries attack with a vengeance, and in this case, in waves of six against your mobile gun position at the bottom of the screen. But unlike most rapid fire games, *A.E.*'s firing system requires a sense of precise timing, since your time-delayed projectiles detonate only when the trigger is released. Thus, targets can be hit when they are specks in the distance, or when they appear close up and loom menacingly large.

The graphics are great. Movement slowly transforms the aliens from tiny specs in the distance to full-sized rays in the foreground, as they dart behind planets or in and out of buildings to create a three dimensional effect. They gracefully swirl and dive in a variety of patterns before unleashing bombs on your gun position. Sometimes they play follow the leader; at other times they attack in pairs or groups of three. The explosions are nearly syncopated—one of your well-placed shots causes a ripple effect, and one ray after another follows the first to its death.

You must kill at least three complete sets of attacking rays before you advance to the next level. Soon you will be chasing them through the solar system out to the farthest reaches of space where killing them is even tougher. While *A.E.* is in many ways more difficult than its competition and offers great graphics and animation, it otherwise differs little from most shoot-'em-up games. It does require a little thought beyond mere reflexes, and should be considered by the dedicated arcade player.

CAPTAIN GOODNIGHT AND THE ISLANDS OF FEAR

Broderbund
$34.95
64K; II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Documentation	C	B-	*Creativity*
Value for Money	B-	B	*Graphics*

Captain Goodnight and the Islands of Fear allows the player to act the hero in this penetrate-and-destroy arcade mission. Fearless, invincible Captain Goodnight is assigned to penetrate Fear Island's deadly defenses and find Dr. Maybe, his old nemesis, before the world is obliterated by his Doomsday machine. It seems Maybe is demanding 200 billion dollars in gold bullion within twenty-four hours, or else.

After a short briefing, and with your Secret Mission Decoder firmly in hand, you take off in your rocket-equipped jet across the border to the F.O.E. (Federation Of Evil). As you fly your joystick-controlled craft over the barren, scrolling landscape, you encounter the F.O.E. deadly defenses consisting of radar-controlled anti-aircraft fire, plane-launched heat-seeking missiles, and other dangers. This is not Club Med. It is best to fly fast and take out radar and anti-aircraft batteries if you wish to survive. If you are hit, you bail out battered and bruised, and are picked up by a friendly craft. Undaunted, you fly again, but you've lost some precious time.

Once you have crossed the Potia Inlet, filled with tempting targets, you parachute into the Araan Desert. There you will have to make it past hordes of robots and orbiting killer satellites to the submarine base. You'll lose hours of valuable time if you are stunned repeatedly by robot fire. But if you shoot from a kneeling position and hop into a a stray jeep, you might make it through the desert in record time.

The submarine crossing only requires avoiding the floating mines, but the robots that you encounter on Odom Island use an entirely different fighting tactic. They lob their fire in an arcing trajectory so that you

must rush them to avoid injury. The island has a mountain ski lift, a good transportation source.

If Captain Goodnight gets this far, there is still the dangerous speedboat crossing to Modo Island, and then another land crossing to an airstrip to steal a plane to Doom Island. Doom Island's defenses guard the approach to the Doomsday machine. If you get past them, you must again use your Secret Decoder to find the correct deactivation combination for the Doomsday machine.

The game, which plays like a movie script, is difficult. It will take even a veteran arcader hours, possibly days, to master. The graphics are fair to good, but the scrolling isn't very smooth. Only the opening scenes are impressive, and they disappear before you actually begin play. As in Broderbund's other popular game, *Choplifter*, only the mission objective is important. You don't accumulate points by destroying enemy targets. Your score is measured in the hours and minutes that remain after the Doomsday machine has been deactivated. Overall, the game is challenging, but only moderately interesting. Nevertheless, true arcade players will enjoy *Captain Goodnight*.

CAVERNS OF CALLISTO

Origin Systems, Inc.
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Creativity	C-	B-	*Graphics*
Documentation	B	C	*Value for Money*

Caverns of Callisto is a visually attractive scrolling arcade game in which the object is to recover forty stolen parts including an ion drive from an enormous cavern on the planet Callisto. It seems that the mutated life forms that exist on that planet have ravaged your patrol ship while you were out on a mission. The cavern is divided into chambers sealed off by large doors that require keys to pass.

Your joystick controlled hero is equipped with a jet pack for flying through the chambers. It is powered by fuel, so it is important to locate fuel canisters strewn about the chambers. He also has a High-energy Plasma Rifle to destroy the hundreds of alien mutants that inhabit the cavern. The Plasma Rifle has a tendency to overheat, so use it sparingly. The gun only fires in the direction the trooper is facing; he is turned with one of the two fire buttons.

The game is basically a variation of those "collect-the-treasure, kill-off-the-alien" games. It is a dull and repetitive game requiring little strategy. The skill mostly involves careful flying to either avoid the numerous creatures or good aim to kill them. The game is lengthy with a large, involved map of the cavern to get through. Winning is neither quick nor easy.

The graphics present some very smooth, full-screen scrolling that is rather unusual for Apple games. Animation is well executed and adds some cuteness to the role of the hero. In sum, the game, although lengthy, is too repetitious to hold the player's interest for the entire time it takes to succeed in finding the ion drive.

ELIMINATOR

Adventure International
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	C	B-	*Graphics*
Documentation	C	C+	*Value for Money*

Eliminator is a very fast action space shoot-'em-up game, where the object is to destroy as many alien objects as possible. Your joystick controls a laser-equipped fighter. Thus the ship's direction can be easily reversed, thrusted, and vertically guided while battling a screen full of aliens.

In a token attempt to simulate horizontal scrolling, several moons move opposite the ship's direction. But the effect of ground scrolling that would have added to the illusion of motion is missing since the game is set in deep space. The aliens, however, move correctly in relation to your ship's thrust and velocity. These aliens shoot back at you during your attack. Your ship's shields can withstand sixteen hits before destructing, but a direct collision with an alien costs you a ship. Survival is the key, and if you can last long enough, you warp to a tougher lever where more types of aliens in greater numbers are sure to make mincemeat of your three ships. One nice feature allows you to start at one of three advanced levels. Arcaders might like the extremely fast action of this game.

GALACTIC GLADIATOR

Strategic Simulations, Inc.
$19.98
48K; II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	B	C	*Graphics*
Documentation	A	B	*Value for Money*

Galactic Gladiator is a tactical shoot-'em-up in which two teams of futuristic aliens battle each other using lasers, disruptors, and hand-held guided missiles. Each team first enters the commands for its gladiators: move, dodge, attack, change, or reload one of two weapons. In the action phase, the first shot goes to the fastest draw, perhaps nailing the key man in the opponent's attack and temporarily or permanently putting him out of action. Combat normally continues until one team eliminates the other, or surrenders, although some options have a "capture the flag" variation.

The main strength of *GG* (as it likes to call itself) lies in the ease and speed of play. Well prompted, single keystrokes define actions for the gladiators, display the options available (including a save game feature), or call up a readable set of current attributes. With two opposing players, or one player controlling both teams, play proceeds with pleasing speed. In a solitary game, where you control one team and the computer the other, the speed decreases noticeably. The computer proves a formidable foe; the documentation provides some insight into the strengths and weaknesses of the computer's game (which allows you to cheat).

You can call in a number of variations during the start-up procedure, which has many menus. You can choose one of six game scenarios, indoor or outdoor arenas in three different sizes (with or without grid marks), fifteen species of gladiators, eleven types of weapons, and two degrees of armor. You can also merge previously saved teams, or change just about anything you wish, to the point of creating your own game and monsters. You can save either an in-process game or the victorious team to a separate disk, initialized from the Strategic Simulations disk. The otherwise good documentation falls down in describing how to use this feature, which takes some getting used to because of all the menus and options. The graphics also leave something to be desired, although exploding characters following a hit add a touch of drama. While some shape tables dot your screen, all of them bear a marked similarity to a low resolution display. The game has some animation, color, and sound—but none of them strong points.

Despite the many variations, *Galactic Gladiator* wears thin after the first several games. Each game bears a certain similarity to the others, with the variations insignificant. One last detail: don't be misled by the cover—you won't see that woman again.

NORAD

Roger Wagner Publishing, Inc.
$19.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B+	B	*Value for Money*

Norad pits an enemy barrage of intercontinental ballistic missiles against your anti-ballistic defense system. The enemy missiles, surging in waves over the polar route, are aimed directly at the largest cities of the United States. The object is to intercept them with anti-ballistic missiles launched from one of ten scattered bases.

The game is a totally new approach to the usual missile command genre. It features a map of the United States as seen in perspective from above the equator. One has a clear view of incoming missiles over the Arctic from this angle. The missiles are guided by the arrow keys, and detonated by the space bar. However, only one missile can be controlled at a time, although you can launch missiles simultaneously. Destruction of useless ABM's becomes a key part of the strategy.

Once a missile wave has ended, damaged cities are rebuilt and missile bases are resupplied. It does take a certain number of surviving cities to maintain an adequate defense posture. If you survive enough attack waves, Congress will appropriate a mobile MX base that can't be hit. A nuclear firing submarine comes much later.

Norad offers a much more strategic game than the usual missile defense games that you have seen or played in the arcades. The game incorporates three levels of play and offers a challenging and fun experience.

OLD IRONSIDES

Xerox Education Publications
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	A-	B+	*Value for Money*

Old Ironsides is an arcade game of skill and strategy in which two players maneuver three-masted ships in

thundering combat. The arena is a square area of sea surrounded by fog. The ships are equipped with six cannons on both the port and starboard sides. They can fire broadsides at the enemy as they maneuver with the wind. The rate of fire is limited to the speed at which powder can be brought to the gun decks, as well as to how fast the guns can be reloaded. While the cannons fire automatically from the side facing the enemy, you steer the ship by paddle control.

Old Ironsides accurately portrays how large sailing ships maneuver slowly in the wind. Since they are sailing ships, they can't sail directly into the wind, which constantly blows south to north (from the bottom of the screen to the top). A ship attempting to sail directly south will become becalmed, a strategy that is sometimes useful. Tacking back and forth is the only way to head south.

There are several ways to sink a ship: by cannon fire, ramming, blowing up the powder magazine, dismasting it while it drifts off screen into the fog, and losing direction and remaining in the fog too long. The ships mostly exchange cannon fire as they pass each other. Damage is usually light. An occasional cannon is sometimes lost, or the ship sails off smoking as one of its sails burns. There are two damage indicators, one showing the amount of damage and the other showing which cannons are left. Dismasting one of the three sails slows the ship down and makes it less maneuverable. An occasional accurate shot with all six cannons will sometimes take out a row of cannons or even blow up the powder magazine. The opponent who loses his cannons on one entire side needs to do some fancy sailing in order to keep the enemy ship facing his only cannon. Ramming is also possible, if the two ships strike each other exactly perpendicularly.

Fog plays a strange part in this game. Everything off screen is fog. When a ship sails off screen, it is invulnerable to enemy fire, but it can fire on screen. However, the ship can only stay off screen for a short period of time. An audible tone gets higher in pitch as the time runs out. Each captain is equipped with a compass to help him steer back. Since this instrument also alerts the enemy to his direction, an experienced captain has the option of turning it off. Sometimes games are won by forcing the enemy off the screen.

Old Ironsides is extraordinarily realistic. The ships are portrayed in beautiful, detailed Hi-Res graphics, with each of the masts showing clearly. Cannon volleys indicate the number of balls in the trajectory. If the distance between ships is too short, the shots splash in the water. The burning ships even emit smoke. The two ships are slightly difficult to tell apart. While one has white sails and the other red, they look amazingly alike on the screen. It isn't really a problem, however, since you rarely lose track of your own ship. Control, which is deliberately sluggish, is frustrating. Sometimes you initiate a turn, and the enemy is just moving in range. You press the button hoping for an instantaneous response, but the cannons are still loading. Two seconds later, they fire just as the ship turns.

Old Ironsides is an excellent skill and strategy game that accurately simulates combat between two old warships on the high seas. Although a little slow, it is, nevertheless, an exciting game which holds your attention for a number of repeat games. A great game for two players!

RANDAMN

Magnum Software
$34.95
48K; Apple II/II+/IIe

Overall Rating	B	Hard	*Challenge*
Creativity	B-	C	*Graphics*
Documentation	C-	C+	*Value for Money*

Randamn is a shoot-'em-up game that takes place on seven different worlds. It is unique in its method of choosing opponents to challenge you. On each of the worlds—The Graveyard, Underseas, the Swamp, Snow, Stonehenge, and Hades—there are seven stages to the battle. A slot machine chooses your opponent—one for stage one, two for stage two, etc. Thus, opponents may all be different or the same. It is just a matter of luck. Each opponent has different characteristics. Some are more deadly than others and some take many hits to destroy. The first scene—the Graveyard—confronts you with ghouls, pumpkins, ghosts, bats, and others. The second level—the Underseas world—confronts you with submarines, depth-charge-dropping destroyers, octopuses, and deep sea divers. The harder worlds supposedly have more formidable creatures, but increasing difficulty is not linear from world to world. Some, like the Underseas world, are quite difficult; while others, like the Swamp, didn't seem to be as challenging. The last, Hades, is a definite ballbreaker.

The game is controlled by a joystick although you can play it with user defineable keys from the keyboard. The man is moved about the screen by pressing joystick button #1, and he can aim his gun and fire in eight directions when using button #0. Screen obstacles not only block his movement, but also act as cover from opponents' attacks.

Each world has a background screen in which the battle occurs. The man and the opponents lack smoothness when moving, but this doesn't detract from the game. The game should be played on a color set since some of the aliens are nearly invisible against the background screen on many monochrome monitors.

The game has good depth and playability. Part of its appeal lies in the randomness of the opponents. You get to see who your opponents will be on each round. You sometimes cringe when more than one of your most deadly opponents appears on the wheel of fortune. The other appeal is the curiousity involved in reaching each of the different worlds. Once you defeat a world, you are given the password to the next level so that in future games you don't have to start from the beginning. This combination of play factors makes this a good game.

RESCUE ON FRACTALUS

Epyx
$40.00
64K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Documentation	B	B+	*Creativity*
Value for Money	A-	A	*Graphics*

This remarkable new arcade game—the first arcade game by the *Star Wars* boys at Lucasfilm—is appropriately cinematic in scope. You pilot a fighter on a rescue mission above the barren surface of the planet Fractalus. The plot is pretty standard—fly through mountainous terrain, dodge Jaggi laser bases, find stranded pilots. Your flight simulator point of view makes the game exciting, and the fantastic graphics implementation is a world apart from conventional games, nearly a leap to the next generation of computer graphics.

You view the game through the cockpit windows of your Valkyrie fighter. A full bank of instruments, including gauges, long range scanner, artificial horizon, and targeting scope fill the lower half of the screen. A blip on the long range scope locates the pilot as he navigates above and through the ever-changing mountain terrain. When you begin a turn with your joystick, the plane banks and the mountains tilt, sweeping past in incredibly realistic animation. By lining up the pilot's beacon on the long range scanner, you eventually home in on a target. When you're in range, you initiate an automatic landing seqence, then turn off your shields. If your ship is pointed at the green marker signifying your ally's downed ship you can see the other pilot running toward you. Sound is important here since you can't see the stranded pilot when he's near your ship. First you hear him knock on the airlock door, then you hear his footsteps inside your ship. When he's aboard, you restart the engines and take off. When you've filled your quota of rescued pilots you can fire your boosters to return to the mothership high above the yellowish nitrate-saturated atmosphere of Fractalus.

While searching for downed pilots, you have to avoid becoming a casuality yourself. Ion beams blast from enemy gun emplacements on the mountain peaks and flying saucers make kamikaze raids straight at your ship. You can use the crosshair and targeting scope to aim your Anti-Matter Bubble torpedos. If you don't clear the area around the downed pilot's position, your shield runs out of energy before you finish your mission. You get extra energy from each rescued pilot's backpack, with bonuses if you rescue an "ace." While you may feel safe on the ground, you should always get a look at pilots before you open the airlock; you never know what you'll pick up.

The excellent mountain graphics are generated by a programming technique known as fractal mathematics. Only 256 points are defined and the computer fills in the surrounding mountains to create a random, pleasing, yet natural effect. Each time you take on a mission on Fractalus, the fractal geometry program racalculates what you see.

I compared several versions of *Rescue on Fractalus* and, while the game isn't slow, it's slower than the rest, and the terrain generator isn't as smooth. The sound effects on the tiny Apple speaker don't compare to those on Ataris or Commodores.

The game has ninety-nine levels, and each time you meet your quota you're promoted a level. The beginning levels are so tame that it is like driving a bus. Fortunately you can start at any of the first sixteen levels. Levels above that are not only more difficult but also involve combined day and night missions.

The team of *Rescue* programmers did a remarkable job designing this game. For better playability they did away with landings and crashes (you lose shield energy, but you don't crash). In doing so, they achieved a three-dimensional game that's a leap beyond ordinary two-dimensional shoot-'em-ups. While I wouldn't call it thrilling, it certainly will hold your interest.

ROBOTRON 2084

Atarisoft
$34.95
48K

Overall Rating	C-	Easy	*Challenge*
Creativity	B-	C+	*Graphics*
Documentation	C	C-	*Value for Money*

This free-wheeling shoot-'em-up game proceeds at an exhilarating pace, offering extreme freedom of movement, the ability to shoot in directions other than the one in which you are heading, and impossible odds against dozens of armed robots. In the year 2084 the

robot population has eliminated all but one family of humans. You must rescue them before the robots succeed in destroying or reprogramming these last survivors. You can destroy all but the Hulk with a single shot. Robot grunts appear in overwhelming numbers, programmed to converge on your position. Predictable, they offer little challenge. You can easily trick them into running into the many immobile obstacles called Electrodes, more easily shot than avoided. Hulks are indestructible. Shooting at them only slows them down. Brains are the most dangerous opponents; they appear beginning with the fifth wave. They fire cruise missiles that chase you around the screen; they also have the power to reprogram humans into kamikaze-like Progs. The second deadliest opponents, Tanks, fire shells that rebound off the walls. Kill them fast. Another dangerous object, Spheroids, don't pose much of a threat in themselves, but release deadly Enforcer Embryos after ten seconds. You must destroy these circular objects before it's too late. The Embryos grow into Enforcers that launch Sparks at you.

The Apple version of *Robotron 2084* offers a number of control options. The coin-op game uses two joysticks, one for controlling the direction of movement and the other for controlling the direction of fire. Since Apples only use one joystick, the joystick mode doesn't allow you to fire in any direction except the one in which you are moving. Unfortunately, this cripples your response in this intense game—the robots can outrun you. The game doesn't last very long when you use just one joystick. An alternative mode employs the keyboard. Two keyboard clusters control both the direction of movement and the direction of fire. You must be a skilled typist to accurately control eighteen keys during the heat of battle. The last method combines keyboard and joystick control. The joystick controls movement and the entire keyboard controls the direction of fire. You have a better chance of survival with this method, but trying to hit the proper keys on an entire keyboard can become somewhat frustrating.

The graphics remain true to the original coin-op version. You can easily discern each of the robot shapes, and the animation is smooth and fast. Control is the main problem. Two joysticks are a necessity in *Robotron 2084*. Without them the game is much too difficult to last more than a short time even with five men. Too bad, because the game is superb in concept and works well on a two-joystick computer.

SEA DRAGON

Adventure International
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	B	B+	*Value for Money*

Sea Dragon is a scrolling undersea arcade game in which you must guide your submarine past deadly mine fields, through narrow tunnels guarded by laser gun turrets and moving force field barriers, and along stretches of water inhabited by deadly eels and other sea creatures. Your goal is to destroy the dragon imprisoned by walls of scrolling bricks at the end of the forty-four screen long underwater tunnel.

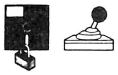
Your submarine, the "Sea Dragon," is completely maneuverable by joystick or keyboard. It is armed with an unlimited supply of torpedoes and a sonic deflector. The latter is actually an annihilator, for it destroys everything on the screen. It is useful in some difficult sections, but it uses 500 units of air each time you fire it. Since you start with only 6,000 units,you should use this weapon only in emergencies. Besides, you aren't awarded any points for killing anything with it. Each time your ship is hit or collides with the walls or mines, it receives a percent damage and begins again at the last checkpoint it has passed. While you only have one ship, it can sustain damage of between 10 and 15 percent per hit and thus is equivalent to between seven and ten ships in other games.

Sea Dragon is very difficult with considerable depth. While the use of the sonic deflector will make it somewhat easier for beginners to see more of the game, it still takes an inordinate amount of time to develop a pattern and skill to defeat each of the obstacles. You have to gain ground literally inch by inch over a period of days or weeks. While I have never ventured beyond a quarter of the cave's length, it seems that you would probably run out of air before reaching your goal. The obstacles are very unpredictable, especially the moving blinking force field. It doesn't move smoothly enough for you to bypass it when it blinks off. The tethered mines are also confusing, as they too release upward to collide with your sluggish submarine.

The graphics are a little crude; moving dots, for instance, mark the boundaries of the tunnel. You need to be careful along the edge as these dots are always shifting with the contours of the tunnel as it shifts left. Considering the difficulty of scrolling the screen, this graphics technique is a fair compromise. The game also talks when it boots up and initializes the system. It's cute, but hard to understand as it says, "Sea Dragon" and "Aye, Aye Captain." It even announces "Approaching

maximum damage" at the appropriate points in the game.

Sea Dragon is an enjoyable game once you get the hang of it. Unfortunately, since it is very difficult it can frustrate beginners. There is certainly enough challenge and depth to attract and keep the expert player for a long while.



SKYFOX

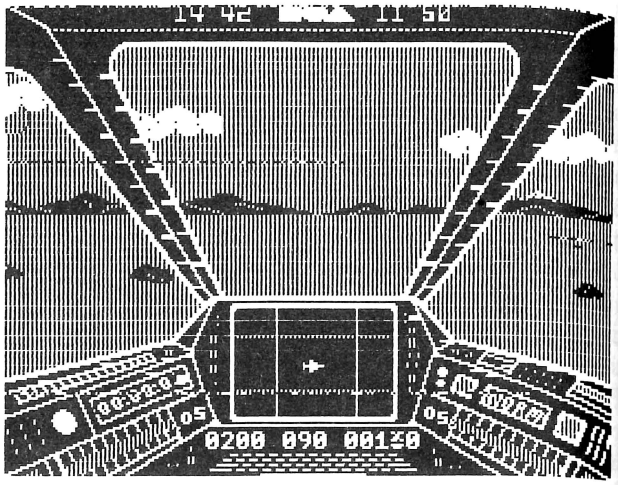
Electronic Arts
$39.95
64K; II/II+/IIe/IIc

Overall Rating	B+	Medium	*Challenge*
Documentation	B+	B+	*Creativity*
Value for Money	A	A	*Graphics*

SkyFox lets you experience the feeling of flying a computerized fighter aircraft at a speed of Mach IV. If you install a Mockingboard into your Apple for stereophonic sound and hook up your projection television set you'll get an incredible visual treat when the terrain banks and whirls at the slightest movement of your joystick. *SkyFox* isn't a flight simulator but an advanced fighter craft that you don't need to know how to fly. You can bank and dive while pursuing enemy aircraft or swoop down on enemy tanks without worrying about crashing into the ground. The craft is armed with heat-seeking and guided missiles, plus laser cannon. It features advanced radar systems that allow you to look down, ahead, and all around the craft, and shields that provide some degree of protection.

Your job is to protect your asteroid base from an armada of motherships that release hordes of fighter craft and enemy tanks. The fifteen scenarios include simple training missions to massive invasions, and each has five skill levels. Some invasions are ground assault only, others are only airborne, and a few are a combination of both.

The graphics are truly spectacular on the ground assault scenarios. Your plane skims a mere hundred feet over the asteroid's surface and the enemy tanks. Your base grows larger as you approach it, almost as if it were three dimensional, and the tanks grow as you approach them. The radar scanner display just below the plane's middle windshield shows the position of the enemy tanks within the sector and the direction your craft is flying. The space bar toggles it to a front view to help you pinpoint the enemy's location and aim your guns or missiles. The rest of the digital displays and indicators show heading, altitude, shield strength, and remaining fuel and missiles. Additional displays, a computer map, and a tactical map, can be brought up via keyboard commands. These windowed displays slickly float into position. Generally they show the location of all enemy craft and allow you to reach them quickly and automatically via your automatic pilot (activated by either pressing both joystick buttons simultaneously or by keyboard command).



Airborne scenarios are less impressive graphically since there is usually nothing but sky and a few enemy craft. Here missiles are more effective, and you must be careful not to get one of their planes on your tail.

SkyFox is definitely one of the most impressive space shoot-'em-ups on the market. Although it offers nothing new in game play, its realistic graphics will impress even the most jaded player.

STAR MAZE

Sir-Tech
$34.95
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	B-	Easy	*Challenge*
Creativity	C	B-	*Graphics*
Documentation	C+	C+	*Value for Money*

Star Maze is a multi-directional scrolling game in which the object is to find and recover nine power jewels on each of sixteen levels. As your ship accelerates in this joystick or keyboard controlled game, the entire screen smoothly scrolls around the centered ship. While the average game player may not appreciate such speed and smoothness, Sir-Tech has produced an admirable piece of programming on the Apple. Control of the ship's speed is the most difficult part of the game. The ship accelerates in the direction of thrust, and must be retro-thrusted to slow down. The ship harmlessly bounces off the walls at a 90 degree angle,

but must be slowed down to a speed of less than 200 to pick up a power jewel, and down to less than 100 to dock with your base to return the power jewels, or refuel. Since fuel runs out rapidly, it is both important to remember where in the huge maze your base is and to learn how to quickly decelerate your ship to a crawl. This far from easy task requires considerable practice. Loss of ships is usually due to a depletion of fuel rather than enemy fire. As a shoot-'em-up game *Star Maze* sports good scrolling and colorful graphics. With practice, it's fun to play.

STELLAR 7

Penguin Software
$29.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	Hard	*Challenge*
Creativity	C	B	*Graphics*
Documentation	B+	A-	*Value for Money*

Stellar 7 is a three-dimensional game that is similar to the arcade game *Battlezone*. The object is to battle an army of tanks and flying crafts that inhabit the seven worlds of the Arcturan Empire. Each of the worlds is connected by a Warplink that appears after you have destroyed a sufficient number of enemies.

The game is remarkable for its realistic three-dimensional graphics. It is a real three-dimensional world where objects have form and shape. They appear larger as you approach and rotate as you move around them. Since they act solid when you bump into one, you can hide behind an obstacle and feel safe from an enemy tank on the other side.

Your Raven tank is either joystick- or keyboard-controlled. Joystick is naturally best. The tank turns and moves forward or backward rapidly. It has a Gravitic Scope (radar) at the top right of the main screen to help locate enemies and obstacles. This is helpful since the main view only provides about a twenty-degree field of vision. The viewscreen also has a toggled magnified mode for long distance fighting. Protonic shields protect your tank while you seek and destroy the enemy with your nuclear powered cannon. Finnally, there is a cloaking device that can confuse the enemy, but this uses vast amounts of fuel. There is a fuel bay on the third planet and possibly others, but that is a long way away.

Stellar 7 is a good, solid game with excellent playability for the experienced arcader. It plays much like *Battlezone* at a slightly slower pace. There isn't so much a deliberate attempt to immediately knock you out as in the arcade game. However, the flying Skimmers, which often remain too high to hit, have a nasty habit of attacking from the rear as they fly past. Most of the other armored vehicles on the planet Sol are not too dangerous. The enemies on Antares are another story. There are several stationary objects there—like the Pulasar and Laser Battery—that if not destroyed immediately will quickly deplete your shield energy. This planet with surrounding mountains is less stark but very deadly. The remaining planets must be incredibly difficult, but I have yet to defeat the forces on Antares.

Stellar 7 is definitely the best three-dimensional game to appear on the Apple. It is an excellent tank warfare game, very reminiscent of *Battlezone* but with much more depth of play. The graphics are smooth, flicker-free and realistic. In all, it is a game that I would recommend to any seasoned arcade player.

STICKYBEAR BOP

Xerox Education Publications
$39.95
48K

Overall Rating	B+	Medium	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	B+	B-	*Value for Money*

Stickybear Bop is a charming and well animated shooting gallery styled game that was meant to appeal to young children. The object is to shoot at various objects that float across six different playfields. A ball shoots out of the left side and lands on the lower end of a teeter-totter. You shoot it by catapulting it upwards to bop one of the targets. The teeter-totter is paddle or keyboard controlled. Animated targets like ducks, hats, planets, and even Mr. Stickybear himself, float by on three different planes.

You start out with ten balls which are stored in a container on the left side of the screen. If you miss a target, you lose one of the balls. The game ends when all ten balls are gone. If you manage to reach the sixth screen, the birds that aren't bopped can steal a ball from the box.

The graphics are outstanding and animated on all levels. Level two features Mr. and Mrs. Stickybear juggling balls, stripes, and apples. The juggled objects must be hit at the top of their arc. Ones that are hit elsewhere are bopped, but you don't lose a ball for hitting them. Stickybear flys across the screen in a hot air balloon and drops sandbags on your teeter-totter. You can gain extra balls on this round. The fourth level features Mrs. Stickybear bouncing a ball across the screen with rabbits, hearts, birds, stars, and flowers

above her. The fifth features another juggling act, while the last features a flock of ball stealing birds. Levels beyond this are the same but feature more of everything.

Stickybear Bop is a fun shooting gallery game that may fascinate parents as well as children. It is a beautiful looking game that has some of the best animation available on the Apple.

TRIAD

Adventure International
$34.95
48K

Overall Rating	C-	Medium	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C	D+	*Value for Money*

Triad combines the usual shoot-'em-up arcade-style game with *Tic-Tac-Toe*. Each of the nine game squares has the picture of one of nine different alien creatures that you have to battle. These nine types are randomly put into each of the squares to offer game variety. If you manage to defeat the bugaboo pictured in that square, you receive an O. If you lose, the computer draws an X. Three X's or three O's in a row wins, just like in *Tic-Tac-Toe*.

Each of the nine bugaboos has a different attack pattern. If you don't learn the attack pattern which is described in the instruction book, you may never defeat them. For example, arrows which are moving to the right are invulnerable to your missiles. But if you can hit the arrow just as it enters the screen, it will turn and travel to the left. (This is one strategy you will probably never deduce by trial and error.) Some creatures have to be hit head-on to kill them, others from the side. Killer bees can only be destroyed by horizontally-moving arrows. The chessmen are the most interesting. If hit, the pawn will split into a knight. If hit again, it will become a rook, and finally a queen that can be killed. The pieces that were traveling horizontally or vertically will begin traveling diagonally and vice versa.

The game can be played by one or two players using a joystick. In the two-player mode, the player who succeeds in defeating the bugaboo will capture the square. He can't win by default as in the one-player game. The graphics are mediocre, but the game play is intriguing and somewhat challenging. Possibly it's too simplistic to be of any long term interest, but it is still worth considering as a purchase.

TUNNEL TERROR

Adventure International
$29.95
48K

Overall Rating	C+	Easy	*Challenge*
Creativity	C-	C+	*Graphics*
Documentation	C+	C	*Value for Money*

Tunnel Terror is a very abstract game based on the arcade game *Tempest*. It calls for quick reflexes as you destroy shapes and ships that move toward you in a circular ring of channels or tunnels. As you move your spaceship about the perimeter of these tunnels by paddle or keyboard control, you unleash a barrage of fire until you have destroyed all of your enemies. Each successful encounter advances you to the next level of difficulty. The number of tunnels, starting with three, increases by one for each level (at least up to the ninth level—I haven't gotten any further). The game consists of sixty-one levels total. You must destroy your enemies before they reach the top of the tunnel.

Although some of the enemy shapes will retreat, the walker-carrier splits into two walkers which then proceed around the circle in an attempt to destroy your ship. You can usually kill them by holding down the fire button while moving in a sweeping pattern, but only if you have allowed your shots to regenerate. The game only allows eight shots down the tunnels at any one time. On higher levels, crazies appear. If they reach the top and pursue you, you must avoid them, hoping that they will retreat before they succeed in trapping you. This version has no Super Zapper.

I thought *Tunnel Terror* novel and challenging, but as an imitation of an arcade game, hampered by the Apple's technology. The original game theme of hyper warping through one set of tunnels to the next does not appear here. Thus, the use of spikes in this game becomes totally meaningless. The game's paddle control system allows you to circle the tunnel twice and warns you when you approach the end of your paddle range—a good compromise to the absence of continuously turning paddles on the Apple. Overall, the game has merit and should appeal to you if you like games requiring quick reflexes rather than strategy.

ZAXXON

Datasoft, Inc.
$39.95
48K; IIc

Overall Rating	B+	Medium	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	C	B	*Value for Money*

When *Zaxxon* first appeared in the arcades in the spring of 1982 it caused a sensation. The colorful three-dimensional view of a fighter attacking a highly detailed, diagonally scrolling space fortress was a showpiece in computer graphics. The fighter, able to maneuver in three dimensions, could bank on turns and swoop down toward the target as it fired its forward cannons. Its shadow on the fortress below and an altitude gauge on the side helped the fighter judge clearances. The huge multi-screen fortress was protected by laser gun ports, rockets fired from underground missile silos, and force field barriers flew under or over. Targets were numerous including radar dishes, fighters on the runways, gun ports, and fuel tanks worth extra fuel for your ship. And when you finally flew past the end of the fortress, an entire armada of fighters engaged your ship in battle with the intent to stop your ship from reaching a second fortress. Those who managed to negotiate and survive a more formidable defense eventually confronted the megalithic robot Zaxxon himself who stood armed with heat seeking missiles. It took several accurate hits in his vulnerable gun port to win.

The Apple version uses a more simplified background on the space fortress that has remarkably smooth scrolling. The brick walls and the force fields are in fine detail, but the large buildings, colorful runways, and the hexagonal grid have been replaced by solid blue. The radar, missile silos, rockets, planes, and gun emplacements are in detailed raster graphics.

The spacecraft is well drawn, and joystick control is very smoothly implemented. The ship climbs, dives, and banks left and right just like a real airplane. Beginners need to either watch the altitude gauge on the right, or determine their height from a combination of shadow placement and laser strikes.

The outer space fight sequences allow full freedom of movement. The enemy craft change altitude as they approach which gives the effect of side to side motion. Like your ship, these crafts appear to become smaller as they drop in altitude. These sequences lack smoothness, but this doesn't detract from the game. In fact, this portion is a definite challenge that ends when twenty ships have been destroyed.

The second fortress is much more difficult than the first. The real challenge is flying through the narrow gaps between the wall and the force field above. After six or seven of these sections your craft stops directly in front of Zaxxon, a detailed robot who fires a heatseeking missile that slowly homes in on your craft: there is no escape. In order to survive you must shoot the missile down, preferably just as it's fired. A direct shot into the launch tube will destroy the robot.

The Apple disk version compares very favorably with Colecovision's cartridge—similar graphics but finer scrolling. Buyers want the arcade game and that takes more memory than many of their machines have. This version of *Zaxxon* is a compromise, and barely lives up to its reputation in the arcades. But it is a good game that is both playable and enjoyable. Neither version is what I would call addictive, but the game will hold your interest until you master it.

Climbing and Jumping

AZTEC

Datamost
$39.95
48K

Overall Rating	A	Medium	*Challenge*
Creativity	A	A+	*Graphics*
Documentation	B-	B+	*Value for Money*

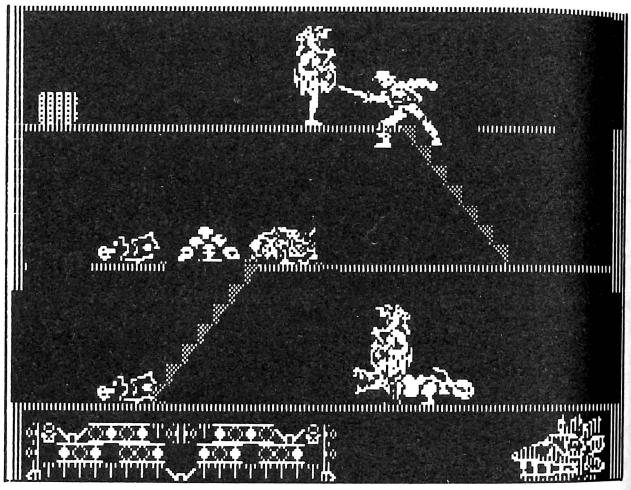
Aztec is a fascinating game that cleverly melds the arcade and adventure genre into a dangerous treasure hunt. A great golden idol has been lost in an Aztec temple located somewhere within a large pyramid in the jungles of Mexico. It may be just a legend, but that is only because no one has ever returned to tell the tale. This temple swarms with deadly, poisonous creatures, and numerous pits and traps from which no mortal has ever escaped alive. The bones of decayed treasure hunters and their supplies lay buried in the rubble.

Aztec is a keyboard controlled game that is well animated like the author's previous game, *Swashbuckler*. There are direction keys for turning around, and various movement keys for walking, crawling, climbing stairs, and jumping. There are keys for opening chests, looking in them, and digging in the rubble. In addition, there is another set of keys for fighting. There are about twenty keys in all to learn, but fortunately, only a handful are used at any one time. This game takes practice before it becomes pleasurable to play; beginners will find it frustrating, but fortunately mistakes are rarely lethal. For example, your man doesn't get hurt if he accidentally falls from one level to another through a hole in the floor.

Each of the randomly picked temples consists of a maze of sixty-four rooms over eight levels. Scattered about are items from chests, or objects hidden beneath rubble piles. Often you will find useful weapons such as pistols or machetes. Pistols are very handy against monsters if you have bullets. Beneath the rubble you might find TNT (hopefully not lit).

This maze is full of surprises and traps, sometimes offering logical solutions and sometimes not. Sometimes a room seals after you enter it, sometimes the walls begin to close, and some rooms have been known to fill with water. Perhaps the TNT could help. There is, however, always an escape.

Monsters are everywhere and they protect their territory. Alligators move in a menacing yet realistic manner. Then there are poisonous snakes and scorpions, giant spiders, and several man-eating tyrannosauri reges. Their size indicates they're probably just babies, but don't be fooled: they are ferocious. And the most dangerous creatures are cannibals. The ones wielding axes are tame compared to those with poisoned tipped blow guns.



Aztec is a very well designed game that offers both beginners and experts considerable challenge and variety. There are eight levels of difficulty with thirty-two different game possibilities. The goal of finding the golden idol and escaping alive can become a formidable task. There is no save game option, but games shouldn't take longer than half an hour to play. *Aztec* has successfully bridged the two distinct game types of adventure and arcade in a fun and memorable manner.

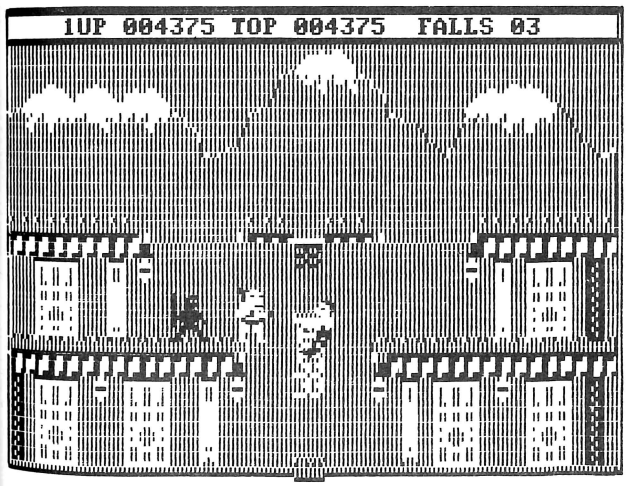
BRUCE LEE

Datasoft
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Documentation	B	B	*Creativity*
Value for Money	B+	B	*Graphics*

The late Bruce Lee, who portrayed a most fearsome warrior in a series of acclaimed martial arts films, was a legend even before his early death. But if his legend's status was ever questioned, it can be doubted no longer: Bruce Lee has become a video game, an honor that, in twentieth-century America, supercedes even being put on a T-shirt or inspiring a pinball game. And for once, we have a game scenario that is very playable, realistic, and worthy of a hero.

The object of *Bruce Lee* is to explore a twenty-room fortress in search of a wizard who holds the secret to immortality. Each adjoining room is sealed off from all others, but all rooms can be reached through a passageway that is triggered by jumping up and collecting hanging lanterns or, later in the game, by throwing switches and pressing flashing buttons. While the lanterns contribute to your final score, not all of them are important in the game.



Your hero is constantly harassed throughout the game by ninjas and the Green Yamo. The joystick controls flying kicks, karate chops, ducking to avoid deadly blows from opponents, and the jumping and climbing necessary to negotiate the various ledges, vines, and ladders in each room. There are traps everywhere: moving walls that force you into impaling swords, floors that explode in flames, electrical beams that fry you on contact, bridges that disappear, and deadly lights that move across the floors. Your timing is quite critical, especially with ninjas and the Green Yamo breathing down your neck. You are allowed ten deaths or "falls" per game.

Like most climbing, jumping games, *Bruce Lee* requires learning a set pattern to get you through the various deadly rooms. What sets this game apart and makes it so playable is the addition of martial arts combat throughout the game. The opponents keep you on the defensive throughout. Bruce trounces a villain only to meet the same bad guy again ten or fifteen seconds later. But if you think about it, that is pretty much the combat situation in the Bruce Lee movies.

The twenty rooms form a maze of passageways throughout the fortress. They wind from top to bottom, then back up top several times. While finishing the twentieth room puts you back at the beginning, the second level of difficulty is nearly impossible. Both opponents, seeking revenge, do everything in their powers to stop Bruce. The game can be played by one person against the computer, or two people can alternate being Bruce in a two-player game.

Bruce Lee is a first-class arcade game. The animation is very good and each of the rooms is detailed. The game is playable and very entertaining, especially for children or teenagers. The beginning rooms are not particularly challenging, as not to intimidate beginners. However, as the game progresses, it offers a definite challenge to the most hearty player. Without a doubt, *Bruce Lee* holds a player's interest.

CHAMPIONSHIP LODERUNNER

Broderbund
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Challenge*
Documentation	B+	A	*Creativity*
Value for Money	B	B	*Graphics*

Championship Loderunner is the sequel to the best-selling arcade game *Loderunner*. The warning on the package, "For Experts Only," is appropriate, for this package contains fifty of the most challenging *Loderunner* screens ever, created by ten people using the construction set feature in the original game. The screens are so difficult that the package includes a hint book to help you through each of the playfields. Although you have to play through each of these screens from the first to the last in order to win, you can get a good idea of what you're up against by just looking at the screen illustrations in the hint book. Some of the treasure rooms are diabolical, with nearly continuous digging or tunneling required to reach the myriad of gold bars deposited by the Bungling Empire.

Since this game obviously takes weeks (or months) to solve completely, there is a save game feature. The ten different save game positions let you either start where you left off or play some of your favorite screens over again. When you have cleared a level by recovering every chest of gold, you see a screen title and hear a victory march. You also receive an additional man to add to your initial five. And if you manage to finish all fifty levels, you get a password to send for your own personalized Championship Certificate from Broderbund. Each certificate is different, based on the serial number of your copy.

There have been several improvements to the game. The two joystick buttons allow you to dig left or right of your man without needing to turn around. This allows you to execute some fairly complicated maneuvers. The graphics are a tad better, with some secret messages worked into the playfields. The complexity is even more diabolical, with traps and places that you can only reach by extraordinary actions, such as using the head of a Bungling Guard trapped in a pit as a stepping stone to reach a ladderless area.

There is no construction set in this sequel. But if you were hooked on the first game and are looking for an even greater challange, this one may humble you.

CONAN

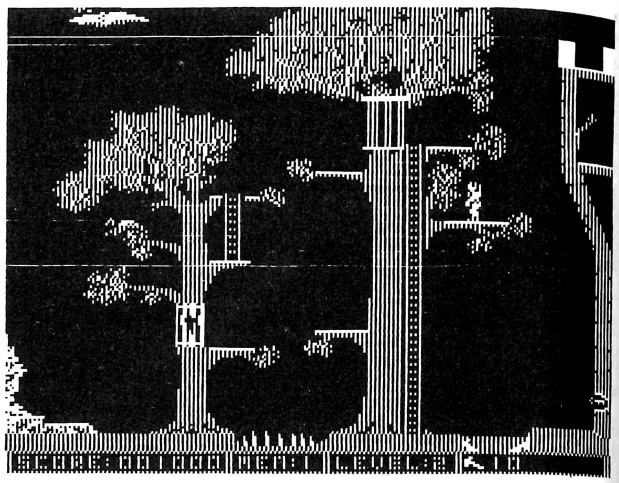
Datasoft
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B-	B+	*Challenge*
Documentation	B	C+	*Creativity*
Value for Money	B	B	*Graphics*

Conan is a seven-screen quest to find and destroy the evil villain Volta. Basically, it is a climbing, jumping action-adventure that requires the player to avoid various pitfalls and creatures on each screen in order to retrieve a jewel and place it in its holder. This releases a key to unlock the door to the next level.

Conan, who is armed with a magical sword that boomerangs back if lost, faces fierce dragons, giant floating eyeballs, electric spark creatures, and other nasties. Unfortunately, not all the creatures he encounters are vulnerable to his sword. This makes some levels extremely difficult to complete, even with clever bits of joystick-controlled acrobatics. Conan can fall from nearly any height without harm, and he performs tumbling leaps at the push of the button.

The game's clever puzzles require careful timing. One level has a pair of transporter booths on different ledges that are guarded by creatures. It might not be so tricky if the creatures didn't ride the transporter, too. Another level contains a giant bubble into which Conan must jump and ride to complete his journey. Then there is the Van de Graff machine with the giant chandelier that needs to be destroyed on level six. A set of moving plates that Conan rides releases a deadly charge when the plates align. Only the lower one protects you from the spark creatures.



The game isn't very difficult on the first two levels, but difficulty increases quite rapidly. You are allowed ten swords and three lives, more if you manage to reach the friendly large bird who keeps watch over you throughout the game. If you lose, you are sent back to level one. It is an enjoyable game with decent looking but jerky graphics. Seven screens might not seem challenging enough, but the game should keep you busy and interested for days, even weeks.

CRISIS MOUNTAIN

Micro Lab
$30.00
48K; Apple II/II+/IIe

Overall Rating	A-	Medium	*Challenge*
Creativity	A-	B	*Graphics*
Documentation	B	B+	*Value for Money*

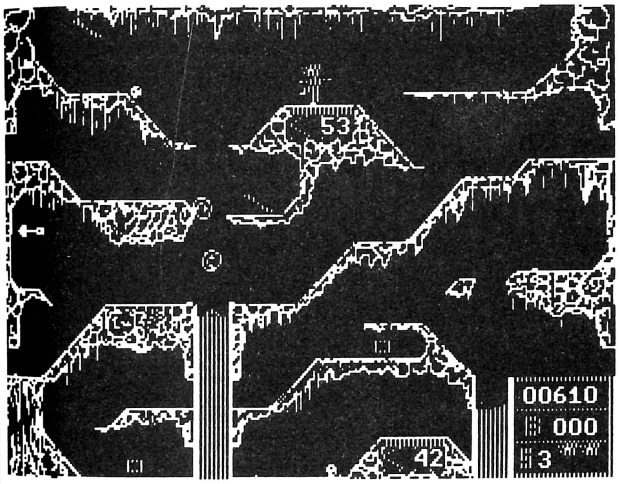
Crisis Mountain is a fascinating, entertaining, and original arcade game that takes place in the caves and tunnels beneath a periodically active volcano. It seems that a group of terrorists, in their hurry to evacuate the cave, left behind their weapons, tools, and several nuclear devices. You must defuse these bombs before they explode and cause a full scale eruption.

The view is a cross section of the caverns where two volcanic vents bubble molten lava. Boulders, some large, some small, spew to the very top of the cave from

where they roll or bounce down the passageways to seek their lowest potential energy. Should a boulder head toward a player, he must jump to avoid it, a la *Donkey Kong*. Joystick control is best, although paddles can be used.

The player begins with three men, each of whom has a strength rating of three. If a boulder hits him, his strength drops one point so that he can no longer run, only walk, and if hit again, only crawl. Time heals, so he soon is mobile again. If he is hit too many times in a row, he dies.

To reach many of the bombs and bonus objects in the cave, the player must often leap across the lava pits themselves or crawl through narrow passageways. This takes some dexterity and practice. While it is best to be careful and wary throughout, time is of the essence. Retrieval of the shovel will speed up your digging, but it is randomly sited, often at places difficult to reach; and, if you are struck by a rock, it drops to a new location in the cave. To dig, the player must drop to his knees, and dig quickly through the surface to the bomb. A counter shows the amount of time left on each detonator.



When a level is completely cleared there is a bonus run. The time left on the bomb clock is added to your bonus time. You are free to collect treasures and supplies until you run out of time, or are hit by a rock or Bertram the Bat. When you have cleared all the supplies, you enter the Nova round. Novas are worth extra points if you pass over one. Two more appear, then three. If you have at least one man left after this round, you go on to the next level and a new cavern.

The game is excellent and a lot of fun to play. It is slow moving, but there is always enough going on to hold your interest. Enough randomness in both game set up and dangerous obstacles makes the game challenging. It is also fairly easy for a beginner. The graphics are nicely animated and will please spectators who are awaiting their turns. An average game takes fifteen minutes, so friends will have to buy their own computers to get much game time. This arcade game, finally, ranks high on my list of must-haves.

DINO EGGS

Micro Lab
$34.95
48K

Overall Rating	C+	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C	*Value for Money*

Not just another climbing, jumping, arcade game, *Dino Eggs* has an interesting, if weak, plot. It seems that when you traveled back in time to the Mesozoic period to check out life forms, you accidentally infected the dinosaurs with measles. You know the dinosaurs are doomed and feel obligated to transport as many dinosaur eggs to the present era (2047 A.D.) as possible so that the species survives.

The screen consists of a number of interconnected cliff ledges strewn with boulders. Danger lurks everywhere in the form of radioactive spiders and worms, and worse, Mama dinosaur. When she puts her foot down, you can kiss both time periods good-bye.

Even beginners will find this game rather simple. For one thing, you can't get killed by falling off of cliffs. For another, the eggs are out in the open—just kick a boulder out of the way. You grab the maximum number of eggs that you can carry (three) and return to the time portal unless you see the warning "Build Fire." That message means that Mama lurks nearby. You can't dodge her huge, speedy foot, but you can scare her off with fire. If you place one piece of wood on top of another, a nice hot fire results. That gives you time to transport the eggs if you can dodge the radioactive creatures. One bite from a snake, spider, or protopede and you must rush back to the time portal for decontamination. If you miss it by a second, you mutate into a spider. Scratch another life.

You must pick up all of the eggs before they hatch and advance to the next harder, faster level. Eating a strength flower helps, because it enables you to carry six eggs at a time. *Dino Eggs* has nine skill levels.

Game play resembles that of many other climbing, jumping games except that you must keep the fire going while dodging deadly creatures and transporting eggs. While the game has tension, it lacks excitement and depth. Moreover, the character seems entirely too normal for someone from the future on such a perilous mission. He doesn't carry weapons or scientific tools.

The graphics and sound effects are just average. If you like this style of game, consider this one, but beware the steep price.

DONKEY KONG

Atarisoft
$34.95
48K

Overall Rating	A	Hard	*Challenge*
Creativity	A	A-	*Graphics*
Documentation	C-	A	*Value for Money*

The heroics Mario performs to rescue his girlfriend from the clutches of Donkey Kong, who holds her captive atop a mass of broken girders, has become one of the most popular games in arcade history. I'm glad to report that the Apple disk version duplicates the arcade game in all four screens, and can be played via joystick or keyboard control.

Mario begins his girlfriend's rescue at the bottom of a stack of inclined girders from a construction project, some connected by ladders. Donkey Kong, a large and sinister looking ape, attempts to stop Mario from climbing up to rescue the girl by rolling barrels down the ramps. Mario has to either jump over them or break them with a hammer as they approach. Bonus points dwindle rapidly with time, so ignore the hammer and proceed as quickly as possible toward the top. Mario moves in the direction of the joystick; to make him jump you press the button. Watch out for falling barrels that sometimes take shortcuts down the ladders. A burning canister ignites barrels that reach the bottom, turning them into roaming fireballs to plague Mario. Oddly, this version has very tall ladders that allow Mario to safely pause between ramps, something impossible in the original game. Mastering this level takes timing and dexterity.

The second screen consists of a pyramid of girders. Mario must dash over the eight steel rivets that hold the structure together while taking care to avoid the gaps and the pursuing fireballs. You need only learn the pattern to reach all eight rivets without getting torched. The hammer next to the top level helps Mario destroy several fireballs if he gets cornered, but he doesn't need it to reach all the rivets and bonus prizes dropped by his girlfriend, still prisoner at the very top.

The third screen offers perhaps the toughest challenge. It consists of a series of platforms connected by ladders and separated by two fast-moving elevators. Several fireballs guard the platforms and make jumping hazardous at best. Donkey Kong compounds the problem by throwing bouncing, spring-loaded girders from the very top. It requires careful timing to jump over this never ending series of falling girders. The trajectory varies slightly from the original game, and the girders fall in three offset but predictable places. This level requires much more skill and dexterity than the other screens.

The last screen consists of a complicated series of conveyor belts connected by ladders. Fireballs pursue Mario as he leaps over moving sand piles on the conveyor belt in his attempt to reach the girl at the top.

The graphics in *Donkey Kong* are excellent, with detailed, multicolored, and well animated characters. Different screen dimensions introduce several differences from the original game, since the arcade game's screen is vertical rather than horizontal. Screen one lacks a ramp and Kong stands on the far right. To prevent a "squeezed" look on screen two, designers resorted to placing the girl on the same level as Kong. When Mario approaches her, she instantly moves to the opposite side. The other two screens remain virtually the same as in the arcade version. Unfortunately, the sound is mediocre, with the theme a bit off-key.

One person can play alone, or two can alternate turns. You can start at different levels, but each starting level begins with the first screen, thereafter shifting to the appropriate screen. Each player begins with three lives and earns an extra life after amassing 7,000 points. Both keyboard and joystick control are sensitive. You can't climb a ladder unless Mario is positioned exactly in line with it, but you can lose a man if you delay climbing a ladder while chased by a fireball, especially in screen two.

Overall, *Donkey Kong* is an extremely good arcade game. Apple owners will find this translation quite authentic.

HARD HAT MACK

Electronic Arts
$19.95
48K; Apple II/II+/IIe/IIc

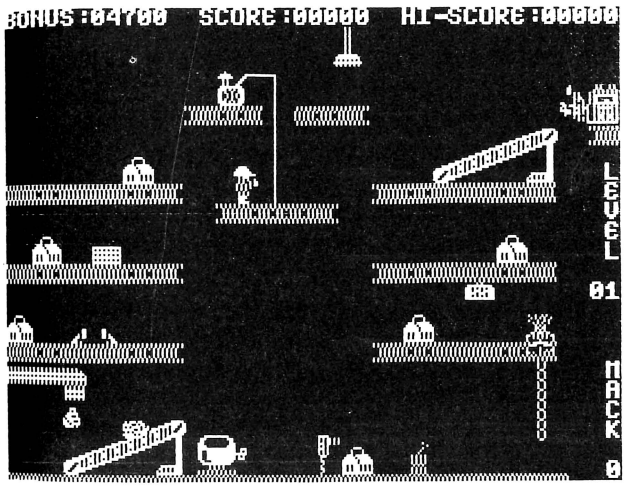
Overall Rating	B+	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	C+	B+	*Value for Money*

Hard Hat Mack is a jumping, climbing arcade game in which our hero tries to construct a building while avoiding the OSHA inspector, falling rivets, and other construction hazards. There are only three screens in this joystick-or keyboard-controlled arcade game.

The first screen shows an unfinished five-story building. You must first place girders into the holes in the

framework. Having done this, you must rivet them into place with the rivet gun, which you have to chase to catch. All this is extraordinarily difficult because the OSHA inspector is chasing you, and deadly rivets are constantly falling around you. You can travel between floors by climbing the chains, riding the elevator, or jumping on the springboard on the left side of the screen. If you don't rivet the girders in place before you die, you have to put them in again with your next man.

The second screen is a little easier and has more interesting graphics. The object is to collect all the toolboxes scattered around the many uncompleted floors of the building. A girder on the hoist will move you from floor to floor. Several of the toolboxes are easy to get. Nevertheless, you must time yourself carefully when you leap past an opening and closing contraption and sneak past the inspector, who is standing guard on the street level. Once you have gotten all the toolboxes, you have to time your ride to the top so that the big magnet will pick you up and transport you safely past the last conveyor belt.



Your mission on the third screen is to grab all the steel blocks that are scattered about the five-story structure and put them into the rivet machine. This is not at all easy because there is an abyss between the right and left sides of the building. You must cross over this chasm by carefully falling onto the twin springboards. There is also an elevator-type conveyor that can transport you up and over the top, but not around the bottom. It sits dangerously over the chemical toilet. Adding to the danger are the exposed wires on one of the conveyor belts and the riveting machine itself.

You need a long period of time to master this game. "Master" perhaps isn't the right word because the objects you collect are randomly placed during each game. However, you can learn the technique of finishing each level. The three screens, though a real challenge, are not enough. The first screen is the most frustrating, difficult, and least interesting. You can start the game on other screens if you press the numbers 2 or 3 before you press the joystick button to start. The animated graphics and the game design are top notch. *Hard Hat Mack* is definitely an arcade game that will challenge the best of players.

THE HEIST

Micro Lab
$40.00
48K

Overall Rating	B+	Medium	*Challenge*
Creativity	B+	B+	*Graphics*
Documentation	B-	B	*Value for Money*

Our hero, Graham Crackers, is engaged in international espionage. To retrieve a microdot hidden in a museum painting, he infiltrates a museum that actually fronts for a criminal organization, and heists every painting and work of art in the ninety-six booby-trapped rooms. The game resembles a climbing, jumping arcade game because he faces moving platforms to leap across, elevators and escalators to transport him from floor to floor, and ropes to slide down or climb up. Crackers can even get around by jumping from section to section of moving scaffolding activated when you press the space bar.

Art works adorn most of the walls on each of the three levels of each screen. At least five rooms occupy each screen. When our hero exits the screen, the disk whirls before the adjacent screen appears. Some of the rooms require keys for entry while others require tricks. Roving robots guard many of the rooms; others are fiendishly booby-trapped with spikes, falling weights, alarms, and monstrous stompers. To collect each of the paintings, you must move Graham Crackers past each obstacle. Work quickly, because you only have two minutes to collect the next painting before the game ends.

You learn how to play this essentially arcade adventure by playing until you eventually figure out how to reach all of the art treasures. Since the game plays the same each time, you will eventually tire of it after you recover the microdot several times. The game is by no means easy—none of the play testers has yet succeeded in recovering nore than half of the art works. When you lose a man, you start over, which gets frustrating. Retracing your path is just as deadly as the first time. Nonetheless, this well-designed game holds your interest. It has very good, detailed graphics and is playable and entertaining.

JUMPMAN

EPYX
$18.00
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A-	B	*Graphics*
Documentation	B	A	*Value for Money*

Jumpman is a thirty-screen arcade game in which the object is to defuse bombs that have been planted in the buildings of Jupiter Headquarters. You play Jupiter Jumpman, who has seven lives (just two short of a cat's) and the outstanding ability to leap between widely spaced girders. One misstep, whether an ill-timed leap or an encounter with a trap, robot, or dropped girder, means instant death in your bomb disposal quest.

The game, which can be played by one to four players, is joystick-controlled. Jumpman moves left or right, and climbs ladders or ropes with simple left, right, up and down movements. Leaps are made in the desired direction by pointing the stick in the proper direction and pressing the trigger. He jumps further if he has a running start. His speed (which defaults to medium) can be changed at any time during the game.

The game offers considerable depth of play. Each of the thirty levels provides a unique challenge. The beginning levels are very predictable: certain robot-like monsters chase after you as you collect the bombs. Some of the girders are connected by ladders, while others use ropes. Sometimes bullets are shot at you from the edges of the screen; and on one level, two gunfighters are tracking you down. One level features a dragon that you have to spear to kill. And another ends in a merry chase after those last few bombs that continually move about the screen while you climb up and down the ladders in pursuit. Upper levels tend to be much more puzzle-like. Usually there is something still chasing you, but the order in which you defuse the bombs can prove to be very important. Touching one will often remove an important ladder or girder, making another bomb unreachable. One level even appears to be completely blank, becoming visible as Jumpman moves around. You sometimes have to leap into the unknown, gambling throughout that a girder will appear on the other side. Fortunately, when you make a mistake on any level, you don't have to start that level over. Only the bombs you haven't collected reappear.

There are five games on the disk. The beginner's game has eight easy levels (1-8), the intermediate has ten (9-18), and the advanced has twelve (19-30). The Grand Loop has all thirty levels, while the Randomizer allows you to play a random selection (but always starting with Robots II). Each play level is timed, so if you finish the level quickly you receive a bonus score added to the points collected for dropping bombs and killing creatures. In the multiplay games, each player plays until completing a level or losing all men. Then the joystick is passed to the next player, who tries his hand on the same level.

Jumpman is much like several of the other "jumping" games (e.g., *Miner 2049er* or *Candy Factory*). Although *Jumpman* is less polished, it offers considerably more levels or depth than its competitors. It is a very playable game relying on the curiosity factor to entice you into playing the game all night. Control is good, although you can occasionally get stuck on a ladder in a tense situation. Jumping to safety usually corrects the problem. The graphics and sound are little better than average. *Jumpman* is a very good game that will certainly hold your interest for a long time.

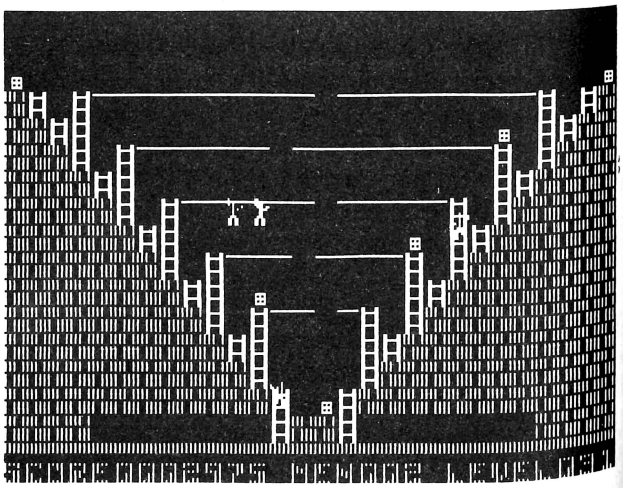
LODERUNNER

Broderbund Software
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A	B	*Graphics*
Documentation	B+	A	*Value for Money*

Loderunner is a challenging game with 150 different screens or levels. The game is one of those climbing, jumping, ladder and platform style games in which the object is to recover the gold scattered about in the various treasury rooms. Each treasury room is guarded by three or more bungling Empire guards who aren't very bright and can be easily trapped by your unarmed Intergalactic Commando.

The game is joystick or keyboard controlled. The commando can climb ladders, jump down from any height, walk across platforms, and travel hand-over-hand across the bars spanning high spaces. He is



equipped with a laser drill pistol to drill passageways through fissured bricks in order to reach hidden gold in sealed chambers or jump between levels. These pits are also the only way to kill or trap a guard.

Each of the *Loderunner* levels presents a fresh challenge, but many require a bit of strategy to master. Some appear unsolvable even after playing them for a long time. They are all solvable but often they build on clues found in earlier levels. Although you can play any level by using the documented cheat keys, there is a certain progression to the game that begins on the first level. These cheat keys also let you play more men, but if you use the cheat keys, you can't save your high score—a fair tradeoff.

With the inclusion of a screen editor to create your own levels, the author elevates a game with good depth to one with unlimited depth. This editor allows you to easily create storage disks with 120 different levels. It is the simplist game generator on the market. The cursor is moved about the screen with the I, J, K, and M keys. Choosing one of the number keys places floors, ladders, handbars, trap doors, gold chests, enemies, and the player anywhere you please. The O key erases mistakes. The Control-S key combination saves the board before you play-test it. Fine tuning each board for playability becomes the hardest part of the game design.

Loderunner is a definite winner. Its graphics offer good animation and it has surprising depth. Strategy is emphasized over outright violence, and the game is to be won only through planning and strategy.

MABEL'S MANSION

Datamost
$29.95
48K; II/II+/IIe/IIc

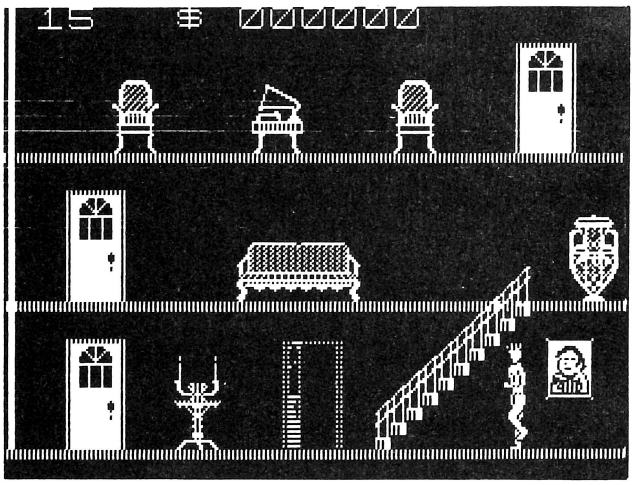
Overall Rating	B-	Medium	*Challenge*
Documentation	C	C	*Creativity*
Value for Money	B-	B	*Graphics*

After the success of *Aztec*, arcade-adventure games have become the rage. They combine dexterity with some of the problem-solving possibilities of graphics and text adventures. *Mabel's Mansion*, in which the object is to find and recover from Barney's deceased aunt's mansion her hidden fortune, should take days, maybe weeks to solve. Fortunately, there is a save-game feature.

The game's main difficulty is discovering the proper sequence for moving objects while eluding the creatures that guard her treasure. The game, unlike pure adventure games, doesn't have true puzzles to solve. Worse yet, it's keyboard-controlled, utilizing thirteen keys that require the dexterity of a touch typist to play. There are keys for moving left, right, up, and down, and a key to stop. Other keys allow you to go forward or backward through doors, jump, push, open, take objects. The A key lets you choose any of your found weapons, and pressing the space bar activates that weapon. In addition, there are inventory, save game, and restore game keys, but at least these don't have to become second nature in order to enjoy the game.

The game can only be mastered through practice, practice, and more practice. There should have been some attempt to combine joystick play with keyboard commands, but, then again, after two or three bad to mediocre games, Kevin Bagley has never mastered a good joystick routine for the Apple.

Actually, *Mabel's Mansion* is interesting once you get the hang of using the key commands. The mansion's rooms aren't just laid out end to end, as in *Heist*, but in groups of three rooms that are connected by passageways. That is why you must be able to move backward or forward, into or out of the screen. These passageways are initially locked, so you will have to find the hidden keys.



Whenever you push or open an object you hear a funny sound. This means something is happening, whether you see it or not. A simple beep means nothing happened. The trouble is, you may have to push or open an object several times before it trips a trigger. Sometimes it is necessary to retrace your steps in order to activate something that couldn't be activated until another object in that room was tripped. This is why it is so important to save the game before you are killed. Saving the game frequently lets you play it over and over. Otherwise, you get another randomly set game, and you probably won't solve that one either.

Dealing with the creatures can be a big problem. Unlike those in *Aztec*, these guys move quickly. You'll

need to find weapons like the guns on the wall to use against them. When you press Attack, the weapons screen is displayed. The game actually pauses while you choose a weapon with the arrow keys. That way you can plan an attack before returning to the game, and the monsters are exactly where you left them. Different weapons are effective against different creatures. Who knows what might be effective against Mabel's ghost?

The game is certainly challenging, although perhaps it is not logically challenging. The game is also frustrating, to say the least. You can get killed quickly (losing fifteen life points) if you don't find the right weapons to deal with the creatures. It is not possible to just outjump them when you are examining every object in sight. The graphics are good, although some of the smaller objects, such as the jewels, are barely visible. In sum, the game will appeal to a certain group of individuals who like long intricate keyboard-controlled games like *Aztec*. But the arcade player who likes quick easy games will give up after ten minutes.

MINER 2049er

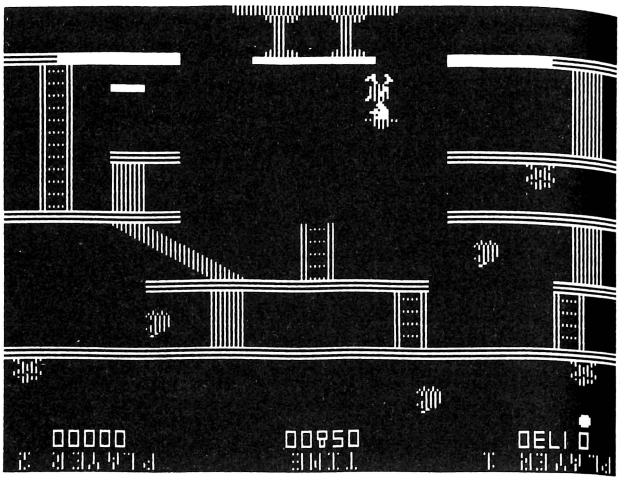
Micro Lab
$39.95
48K; II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Graphics*
Documentation	B	A	*Value for Money*

Miner 2049er is a ten screen arcade game in which the object is to claim or capture each mine station in a mine inhabited by mutant organisms. In some ways the game is similar to *Donkey Kong* in that the player, Bounty Bob, climbs and jumps about on a building framework. But the game is certainly no copy and, in fact, is much more involved since each mine station has a different set of hazards and requires a different technique to beat.

As your player moves about the mine station, the framework beneath his feet turns to a solid color. To claim a station and advance to the next, you must fill in every section of the framework. The framework is often connected by ladders, and Bounty Bob can leap across sections of the same elevation. However, if you fall too far by miscalculating a jump, it can mean instant death. Deadly mutants also roam the framework, but you can dispose of them if you touch one of the apples scattered about. The mutants, who turn green for a few seconds, are then vulnerable. In addition, most of the mine stations have a hazard, like the radioactive pool on level six, and the stompers on level nine.

Miner 2049er is a race against time. A timer constantly ticks down while you try to fill the floor on each section of the framework. If it runs out, you die; but if you're successful, the remaining time is awarded as a bonus.



Either an Apple type joystick or type compatible Atari joystick can control the game well. The entire game "feels" cohesive because it has a consistent design scheme, rather than a conglomeration of separate ideas for each level. Each of the stations is consistently harder. The first two or three levels are sufficiently easy for beginners to complete, and only slides complicate the matter. The upper levels, on the other hand, require dexterity and timing because some have moving platforms or elevators that you must leap upon at precisely the right moment. One level has an elevator to assist you, while another uses a cannon to propel Bounty Bob to the proper platform. If you load too much TNT, it's "Good-bye, Bounty Bob!"

The game's graphics are very good, flicker free, nicely animated and colorful. The sound effects are minimal. Overall, *Miner 2049er* has considerable depth and challenge. If a player manages to complete all ten levels he can try to repeat them faster for even more bonus points. This game is a definite winner and should offer arcade fans hundreds of hours of enjoyment. Definitely recommended.

TROLLS & TRIBULATIONS

Creative Software
$24.95
64K; IIe/IIc

Overall Rating	B-	Medium	*Challenge*
Documentation	C+	C+	*Creativity*
Value for Money	B	B	*Graphics*

Trolls & Tribulations is another one of those addictive underground maze arcade games. The object here is to guide a troll through a multi-level cavern maze in search of treasure. At first you only have to contend with ugly cretins who, when shot, turn into eggs. The eggs have to be kicked into the underground river below before they hatch into something truly repulsive. Since each troll has only eight bullets, you can run out at the worst possible time before reloading. Later in the game, you contend with buzzards and bouncing skulls that can't be shot. Here, your only hope is in your timing and dexterity.

As in any climbing and jumping game, your troll can leap from ledge to ledge or drop to lower shelves in search of the key that connects maze to maze. Strategically placed trampolines help you reach higher levels, but beware of low ceilings.

The game is better than many underground maze games, but it becomes horribly repetitious. It gets much faster and much more difficult with each successive level, but there aren't many new elements—just different mazes. What's worse is that you always have to start with the first maze each time you play the game, regardless of your own difficulty level. Still, it is somewhat addictive and reasonably priced.

Sports

BLACK BELT

Earthware Computer Services
$29.95
64K; II/II+/IIe/IIc

Overall Rating	B-	Easy	*Challenge*
Creativity	C	B	*Graphics*
Documentation	B-	C+	*Value for Money*

Black Belt combines an arcade game with a tutorial on the kicks and punches learned in a Taekwon-Do karate class. Taekwon-Do, practiced in Korea for centuries, means the art of fighting with the hands and feet. Each two-minute sparring match follows definite rules which determine each fighter's point count during the match. The player with the most points when time runs out wins. You get points for connecting with an attack and for blocking an opponent's attack. The program warns you and deducts points when you break the rules. For example, you cannot leave the mat, turn your back on an opponent, stall, or land an illegal blow (although the program doesn't stop illegal blows).

You control this game with either the keyboard or a joystick. I found the joystick easier by far. You can maneuver around the mat, turn around, and kick or punch depending on the position of the stick when you press the button. Blows include punches to the left or right, turning kicks to the left or right, flying side piercing kicks to the left or right, kicking down, and blocking low or to the side. Fatigue plays an important part, especially on the lower belt levels. When fatigued, you cannot attack as often or respond well. However, you can still block your opponent's blows.

Black Belt has good graphics and animation. A demo match at the red belt level lets you sit back and watch. You can obtain additional sound and speech effects if you own a Mockingboard. If your Mockingboard doesn't have speech capabilities, I suggest using the Apple speaker. (I found the sound effects alone rather dull on the Mockingboard.)

You can engage in a match against another person or against the computer. Since you can use only one joystick, one player will have to use keyboard commands (using two blocks of nine keys each). A practice section, actually a tutorial, demonstrates the various kicks and punches allowed. Overall, *Black Belt* vividly and realistically simulates the sport of Taekwon-Do. While not as exciting as many team sport simulations, it certainly holds your interest better than some of the boxing games on the market.

KARATEKA

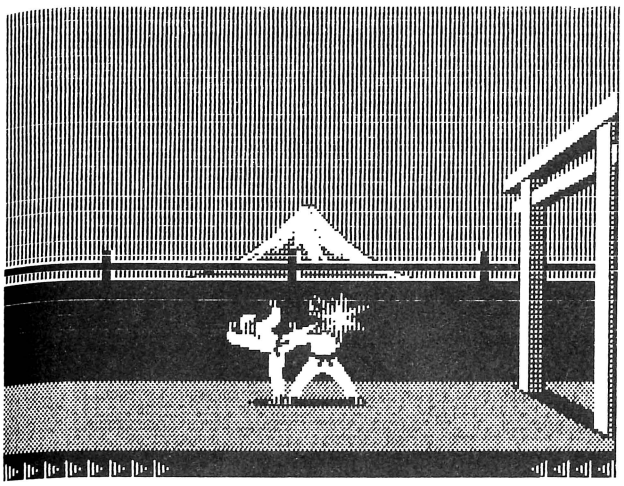
Broderbund
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Documentation	B	B	*Creativity*
Value for Money	B+	A+	*Graphics*

Karateka, the latest martial arts arcade game for the Apple II series breaks new ground in the graphics department. The game, which is scripted like a movie, opens with the confinement of the Princess Mariko in the dungeon of the warlord Akuma. She is forlorn as she walks into the dungeon, then she falls down in a faint. If you decide to watch the rest of the opening sequence rather than immediately begin playing, you see a demo of the young warrior attempting to defeat the various evil henchmen that the warlord sends against him. The animated sequences are spectacularly realistic; the best I've ever seen on a home computer. It is a magnificent blend of story line, music, and graphics.

The premise of the game is to rescue the princess by defeating each of these sucessively stronger opponents. You use a series of karate kicks and punches that you control through joystick or keyboard commands. The joystick buttons allow you to choose between kicking and punching, and you can aim your punches high, low, or toward your opponent's mid-section. Each fighter can take a limited number of hits. Relative strengths are indicated by arrows on the bottom of the screen. Your strength increases with rest, which you can do by slowly retreating beyond the range of your opponent's blows. However, on the first screen you must be careful not to get pushed off the left edge of the palace grounds. Each successive opponent is not only stronger, but different. He has his own fighting style and corresponding weakness. Certain kicks or punches are more effective against different adversaries.

The game becomes very repetitious as you battle a seemingly endless supply of evil henchmen. There are some breaks where the scene shifts to the warlord and princess's cell, and some variations, as when Akuma's pet hunting hawks are sent to mortally wound you.



There is even a puzzle or two where spiked gates slam down to prevent your passage. Eventually, if you are good enough, you reach the princess, your bride-to-be. But the real challenge comes at the end when you finally do reach the princess: be sure to approach the girl with proper respect or she will dispatch you.

Karateka is an entertaining game. Older players and those who have played similar coin-ops in the arcades will wish for more variation to keep them interested. Seasoned arcade players will master the game in a few hours, then yearn for more difficult levels, of which there are none.

OLYMPIC DECATHLON

Microsoft
$29.95
64K; Apple II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Creativity	B+	A	*Graphics*
Documentation	B	A	*Value for Money*

Olympic Decathlon provides the excitement and competition of the greatest and most demanding of all athletic competitions: the ten-event decathlon. Normally a two day event, it requires participation in running, jumping, and throwing contests that include the 110 meter hurdles, discus throw, pole vault, 100 meter dash, long jump, shot put, 400 meter dash, high jump, javelin throw, and 1500 meter run. The competition involves up to six opponents. Excellent animated graphics represent each event, which occur in real time. You use the keyboard or paddles to manipulate the figures on the screen. As in real competition, you need stamina, coordination, reflexes, and timing to win. You win points for each event, based on a comparison to actual Olympic standards.

Several of the events involve running, which requires you to alternately press two adjacent keys repeatedly (right and left arrows). The player who can do this the fastest using two fingers can win the 100 and 400 meter dashes. The longer races will test your finger coordination and stamina. Watch out for cramps. The javelin throw and pole vault also require you to reach a maximum speed, but coordination and timing also play a part. In the pole vault, you must press a key to plant the pole, another to do a proper handstand, and Return to push the pole away before it hits the bar.

Although some of the events are relatively simple, the high hurdles and shot put require good coordination. The hurdles require you to press each paddle button in sequence to successfully clear the barrier. Deliberately running through two hurdles disqualifies you. The shot put requires you to coordinate levels of force. It soon becomes obvious that you must exert the triceps slightly before using the shoulder muscles, or you may throw the shot almost overhead or even backwards.

The discus throw requires good hand-eye coordination, while the long jump and high jump require precise timing.

You can practice any event before entering the decathlon. Once the competition begins, it doesn't end until you have concluded the ten events. It takes about one hour for three people to play, adding about fifteen minutes for each additional player. I suggest that even numbers of people compete (two, four, or six) because the running events are paired. With an uneven number of players, one person will have to compete alone in several events while his or her opponents have the advantage of direct competition.

Microsoft very thoughtfully prevents accidental resets during competition; entering 3DOG allows you to continue, or if you have an autostart ROM, the game continues without interruption. Microsoft also allows you to make one backup copy of their protected disk (with a built-in copy program).

Overall, I thought the graphics excellent. The animation looks smooth and the animated figures professionally styled. I have only one concern: that players, especially children, not abuse the keyboard when switching to two-handed finger pounding during the excitement of competition in the running events.

ONE ON ONE

Electronic Arts
$40.00
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	B+	A	*Value for Money*

This fabulous sports game simulates a two-player half court basketball game. Thanks to the assistance and advice of two of the leading forwards in the business, Julius (Dr. J.) Irving and Larry Bird, the game achieves realism. It captures the moves, bearing, and style of the two men. One or two people can play. Two play against each other; one plays against either of the computer-controlled characters. Larry consistently displays his unstoppable jump shot, while Dr. J. likes to perform incredible ball handling routines with an occasional 360 degree spin around slam dunk shot. Larry, taller and stronger, blocks many of Dr. J.'s shots and likes to push him around.

A referee adds to the realism, judging fouls such as hacking and intentional interference. Each player can jump and block shots, spin around while performing fancy dribbling, and slam dunk the ball. As in the real game, you must clear the ball beyond the key. You get twenty-four seconds to make the shot. A player who indulges in a lot of fancy footwork becomes fatigued, while if you slam into your opponent on a jump shot near the board, it will probably shatter. You even get an instant replay for some of the more outstanding plays.

You can play this game on a number of levels, ranging from Parks and Recreation to Professional. At the highest level, a computer opponent follows you very closely and frequently steals the ball. Beginners will find it easier to play as Larry Bird on either the Parks and Recreation level or Varsity level set on Loser's Outs. This game has hardly any joystick learning curve. Pressing the button lightly spins the player around, while holding it down makes the shot. With two players, usually the offensive player uses the joystick and the defensive player the keyboard. Playing Winner's Outs (scorer keeps the ball) minimizes the need to switch places. Those lucky enough to own two joysticks and a TG switch adapter can use two joysticks. If you're addicted to basketball, buy the adapter. It has other uses.

I can honestly say that I detest basketball. *One On One* lets me do a credible job of ball handling and shooting. This isn't to say that I have won a game, but getting half of my opponent's score isn't all that embarrassing. The main difference from reality is that ball handling isn't crucial in this contest and shooting from far away and close up is semi-automatic and based on percentages. You can do a 360 degree spin around from half way out and either make the shot or barely miss. Blocking shots is very important. *One On One* will surely become a hit, because it simulates the game of basketball flawlessly with expertly animated graphics. It even plays well.

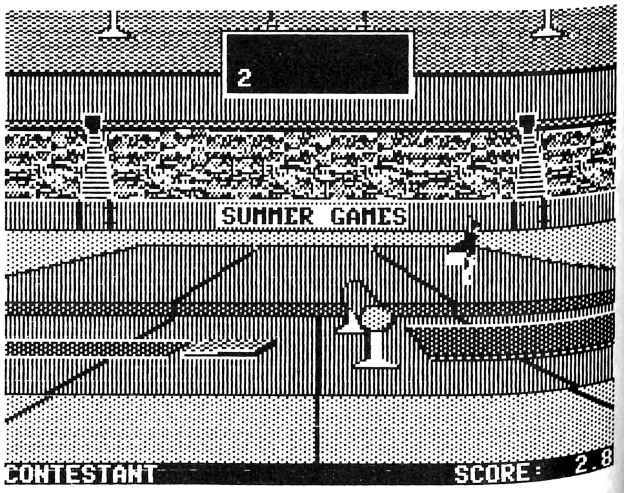
SUMMER GAMES

EPYX
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	Easy	*Challenge*
Documentation	A	A-	*Creativity*
Value for Money	A	A-	*Graphics*

Summer Games is perhaps the most outstanding sports simulation offered for any home computer to date. The graphics are exceptional, from the stirring opening ceremony (where the colorful torch-bearer gracefully runs up the stairs to light the Olympic flame as white doves fly skyward), to the animated effects in each of the eight events. Backgrounds are beautifully detailed with scrolling grandstands filled with spectators, and lovely, puffy clouds. The music, too, is good—from the familiar ABC-TV sports theme music of the opening ceremony, to the national anthems of eighteen countries played during the award ceremonies. EPYX's national anthem naturally is the *Jumpman* theme. Unfortunately, the other sound effects are lacking in the Apple version.

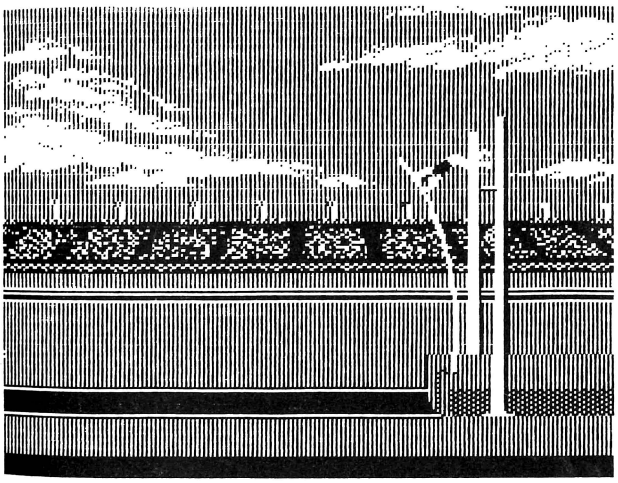
Eight players can compete for gold, silver, and bronze medals in eight events. You can compete in all events, individual competitions, or for the record book that is stored on the disk. Or, you can merely practice in any event. You control the action entirely by joystick or



by keyboard in the Apple version. The lack of two joystick ports here spoils the fun of two-player head-to-head competition in the running and swimming events.

The pole vault competition is a test in timing. The player has to plant the pole in the box by pushing down on the stick as the entrant automatically runs. He must then choose the right moment to kick up and over the bar by pushing up on the stick, finally releasing the pole at the proper time via the button (without, of course, knocking the bar off). Players get three chances and can choose their initial bar heights.

Platform diving is perhaps the most fun. Competition takes place on the ten meter board. This gives you enough time to do a reverse or inward triple summersault. By pushing the stick up, down, right, or left, you control the pike, tuck, or layout position. Form is everything. You can do any combination of moves to increase the dive's difficulty rating, but you must land vertically and fully extended in the water with no splash. Seven picky judges grade you; you don't get many points for a belly flop.



The four-man, four-hundred meter relay race is a test of teamwork and paced running. Each runner is alloted a certain amount of energy, which is displayed at the bottom of the screen. Runners who start too fast out of the blocks become quickly exhausted, then run the end of the race at a snail's pace. The joystick controls the runner's speed. Left is for coasting, right is for fast sprinting. You don't want to be running too slowly when you pass the baton to your team-mate. A computer opponent runs against you in individual competitions.

The one hundred-meter dash is a physical test for the player. It is also known as a joystick buster. You run the race by moving the stick back and forth or up and down as fast as you can. Since the screen doesn't independently scroll for each runner, if one opponent begins to lag too far behind, he becomes "lost" off screen. This is about my only complaint with regard to *Summer Games*.

Gymnastics is another test of critical timing as the player must maneuver a girl on the screen to run, jump on a springboard, hit the pommel horse correctly with her hands, push off, then execute a perfect landing. If you press the button when her hands are on the horse, she can go high enough to perform a single or double summersault. Pushing up on the stick puts her into a tuck position; pressing down makes her straighten up for a landing. She can perform the 180-degree twists if the joystick is to the left or right as she comes off the springboard. The animation is truly unbelievable in this portion of the game.

Two swimming events are offered: free-style relay and one hundred meter competition. They are quite similar, requiring you to push the button just as the swimmer's arms enter the water. This increases the swimmer's speed. The kick turn at the halfway mark is also crucial. Pushing the joystick left at just the proper moment gives you the best head start.

The final event is skeet-shooting. You have to shoot twenty-five clay pigeons from eight different positions arranged in a semi-circle. The fire button releases the targets from the trap houses. Some are single targets launched from one side, and some are double targets.

Summer Games brings the excitement of Olympic competition into your home in a thoroughly enjoyable fashion. The program offers depth and unbeatable entertainment for a group of players—or just one player competing against himself, the computer, or the record book. If you enjoy sports and want an entertainment program that you won't quickly grow tired of, *Summer Games* takes the gold. Outstanding!

Adventure

All-Text

ADVENTURE

Adventure International
$29.95
48K; II+/IIe

Overall Rating	A	Hard	*Challenge*
Creativity	A	B	*Vocabulary*
Documentation	B	A	*Value for Money*
		9	*Save/Restore*

Scott Adams' Adventure International is the fifth company to release the original and classic *Adventure*. Although the colossal cave and the game itself are essentially identical in all versions, this one has several unique and highly desirable features.

1. Lowest Cost: The disk version is $4 less than the least expensive competition and $9 less than the Microsoft version, which has been my preference. A tape version at $14.95 is an excellent value, as instructions are provided for transferring the game to disk.
2. Response Speed: Unlike the other versions, which are highly disk interactive, this game is entirely in memory. The resulting response speed is nothing short of fantastic, a major advantage.
3. Flexibility: The Apple and the Microsoft versions are protected: this version comes with an internal copy program for producing a DOS 3.2 backup copy. It also provides instructions on copying the disk to DOS 3.3, making it the only 3.3 version on the market. Also, nine save-games scenarios can be saved onto the parent disk.

On the negative side, this version omits the significant word "Plover" from the Scenic View description, which may not have been in the original PDP-11 version, but is important. Similarly, there is not a warning provided either for the loss of battery power or an impending transition into a Master's Game phase. In these regards, the Microsoft version is more "playable."

In summary, and despite a near-saturated market, there is a definite place for this version of *Adventure*. Every Apple owner should have a copy of *Adventure*, and dyed-in-the-wool Adventurers having other versions should delight in the flexibility and speed of this version.

ADVENTURE IN TIME

Phoenix Software, Inc.
$29.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A-	Medium	*Challenge*
Creativity	B	B	*Vocabulary*
Documentation	C	A	*Value for Money*
		∞	*Save/Restore*

Adventure in Time is a novel adventure game involving time travel, a helpful robot, and an interesting but not too difficult collection of puzzles. The all-text, split-screen display reacts quickly to commands and provides a crisp, neat appearance in the mold of Scott Adam's earlier games. You must locate the bad guy, Nostrodamus, somewhere in time and kill him before he can assemble the ultimate weapon and destroy the world.

The almost sixty mappable locations divide into five areas, four of them set in different time periods. The well written descriptions partially guide you through the sequence of locations. The game has no mazes, but traps and puzzles will keep an experienced player busy for several hours. Phoenix classifies their games by category: Novice, Rookie, Average, Experienced, and Expert. They rate *Adventure in Time* as suited to experienced players, but it is by no means too difficult for beginners.

AFIKOMAN ADVENTURE Bible Adventure #1

Davka Corporation
$29.95
48K; II+/IIe

Overall Rating	C-	B	*Challenge*
Documentation	B	C	*Creativity*
Value for Money	C	C	*Vocabulary*
		0	*Save/Restore*

The sun beats down on your neck. You put on your sandals to protect your feet from the burning sands. You are on your way to recover that elusive piece of

matzoh, the Afikoman, which you need to complete the Seder. You hope you have everything you'll need from the far distant future to aid you in your quest. If you've left something behind, you may never return again.

It all started when you were finishing the Passover Seder and the children had already found the elusive Afikoman. After all the food and drink, things started to get bleary and your mind drifted off to a world all your own. Using a time machine, you travel back to ancient Egypt, where you hope to survive long enough to recover an ancient matzoh for the completion of your present day Seder. How you do that is part of the problem. You must be familiar with parts of the Bible and be able to convert its words into actions. Some of the items you've brought with you are required immediately, while others have to be held in reserve for later use. Keep your eyes open along the way for other objects that will be handy; you never know what you will need—or when.

If you are really into adventure games, you will definitely be disappointed with this one. Most of the moves are severely limited to direction and action. Every command must consist of two words, usually full-length ones. To go north, for example, you must type "GO NORTH" every time. You can't use "N" or "E" as typing shortcuts. The only single word commands are "HELP," "INV" (or "INVENTORY"), "TIME," "QUIT," and "SAVE." Hints are given at most points of difficulty—some extremely helpful, others so cryptic that you must research the reasoning behind them. Add to this a time limit that allows you a set number of moves before you "wake up" back in the present.

I strongly recommend that you keep a Bible handy, as some of the hints just name particular verses. Even then, trying to interpret the exact meaning of the clue takes time.

Overall, this program is slow to the point of aggravation. It takes close to two minutes for the first command to appear on screen. Add to that the other waiting periods while the computer checks your input against the possible responses for each incident. As an educational tool, forget it. Playing just for fun is okay, but don't plan on traveling quickly through the past.

CRYSTAL CAVERNS

Hayden Software
$9.95
48K; Apple II/II+ with 16K card

Overall Rating	B	Medium	*Challenge*
Creativity	C	B	*Vocabulary*
Documentation	C	A	*Value for Money*
		3	*Save/Restore*

In this all-text adventure, you become an Apple Caverns Estate Landlord after finding sixteen treasures in and below an old Victorian mansion. *Crystal Caverns* has no true plot, but I found the text imaginatively stimulating and a pleasure to read.

Generally, you won't find the puzzles too difficult once you have found them. For instance, there are three places to dig—just look for the likely spots. If you're carrying the right tool, you may think some of the puzzles too easy, but if you don't have the right object, the game simply responds "You can't do that." Hints do not abound; however, useful objects do, and while you use most only once (I only found one that had no use), you use three twice, and one three times, making inventory management a bit tough at times. Most of the puzzles are mildly interactive. One of them is a masterpiece—getting the computer up and running without crashing your disk. The printer output that you end up with is anticlimactic, but at least you'll have a map of the sixteen room maze, which isn't as logical as the rest of the map, and could be drawn without the computer's help. Generally, mapmakers will have a ball with the 122 rooms (excluding the maze), which provide an interesting and essential challenge to this game.

Although disk interactive, *Crystal Caverns* offers only minor delays that don't interrupt the flow of the game. You can quickly make or call three saved-game scenarios at any time. Also, for a pleasant change, you have to work rather hard at getting killed off, like jumping on the rickety bridge—twice. Together with the excellent text, these features make *Crystal Caverns* the type of enjoyable escapism that keeps good, all-text adventures so popular.

CUTTHROATS

Infocom, Inc.
$39.95
32K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Documentation	A	A	*Creativity*
Value for Money	A	A	*Vocabulary*
		8	*Save/Restore*

You're a diver among a group of cutthroats going after sunken treasure in this all-text adventure. Your job goes beyond just diving, however, as you must determine the location and depth of your target based on game-supplied data and a clue from within the game. Your associates include Johnny, the captain; Pete, the cook; and a not-so-nice crewman named the Weasel. Before you can go sailing for lost loot, you must equip your ship and slip past McGinty, the Island's other salvage operator.

There are actually two different end games, each with its own unique puzzles to overcome. You may become a rich diver, or, if you don't do a key action early in the game, a rich, dead diver. Generally, the puzzles are logical and interesting, but not quite as difficult as those of earlier Infocom games. One exception is a rather illogical (and therefore difficult) spot in one of the end games. The story line is very well done and quite cohesive. The game moves quickly.

The parser and vocabulary are typically Infocom—great. There are, as always, a few words that logically should be recognized by the program but are not. You can save or recall games at any time; this function supports two drives, permitting a game to be recalled within five seconds.

This game is a must for Infocom devotees, and would be a good starting point for anyone new to the world of adventuring.

CYBORG

Sentient Software, Inc.
$32.95
48K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Creativity	A	B-	*Vocabulary*
Documentation	C	B+	*Value for Money*
		1	*Save/Restore*

Cyborg is an imaginatively written, all-text science fiction adventure game. You must guess the object, which doesn't become clear until late in the game following a surprising arcade-like (and very effective) Lo-Res graphics interlude. At the outset, all you know is that you are a Cyborg, half-human, half-robot. Having an unusually cohesive plot, the game is more like a novel than an adventure.

Cyborg is big, similar in size to Michael Berlyn's first game, *OO-Topos*. There are 130 mappable locations, including two maze-like areas. Mapping is required; each area must be explored (in ten directions) as the text does not always indicate the exits. The text, while generally well written, is distractingly excessive in some spots. Except for the Droid, the text has little humor or sidelights. The 28 or so objects are well scattered, but do not present a difficult inventory management problem. Many of them are either eaten or worn. The well laid-out screen display, obtained by entering Full Scan (one of four scan types available), clearly shows your inventory, what is being worn, and a description of your location.

One of the game's challenges is its sheer size; you must find the proper sequence to successfully attack it. To get off on the right track, consider using SW, S, D, and E as your first four moves. The actual puzzles are few—more would detract from the novel-like nature. Several, however, are difficult, and clues are limited to the remarks of the small Droid (that comes close to stealing the show), although a Help command occasionally comes through. With the exception of clearing the Cargo Hold, the puzzles are not too involved or interactive. The puzzles are usually logical, but who ever heard of a Cat's Cradle playing Iguana?

The game is disk interactive, but is a little slow for a text game. The two-word syntax is supported by a generally adequate vocabulary. A single save-game may be written to or called from the protected disk at any time, although a three-scenario capability would have better fit the size of the game. Fortunately, with the exception of the Lo-Res area of the game, it is relatively difficult to get killed off. Should this happen, the game permits a reincarnation—not far from where you are killed with your objects remaining at the site of your demise—which effectively adds another save-game capability.

All in all, *Cyborg* is an interesting challenge, dominated by the, "what, where, and why am I?" theme, and a well-developed plot with a few surprises and twists along the way. The game is highly recommended for the intermediate to advanced adventurer; the puzzles, definitely secondary to the excellent plot, are made difficult by the size of the game.

DEADLINE

Infocom, Inc.
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
		8	*Save/Restore*

Deadline is the first in a series of totally engrossing all-text adventure games from the *Zork* bunch. You are seemingly pulled directly through the CRT and right into the mansion with the suspects. You, as the detective, are called upon to investigate the apparent suicide of a wealthy and philanthropic industrialist. There are no monsters, treasures, mazes, wizards, magicians, fantasy, or sound effects, just seven characters with you in a house with grounds having some forty-eight mappable locations. Sounds simple? Guess again! There are several tricky puzzles, a very involved plot, an abundance of well-written text, characters moving independently of one another (and of you), a second suicide/homicide of one of the characters (under certain conditions), and the possibility of twenty-five different endings, including your own early demise.

Like any good mystery, *Deadline* unravels slowly, and is complete with false leads and subplots. You have 12 hours to establish your case and resolve the conflicting issues. Don't try to do it all in the first hour; events transpire at specific times which will alter your suspicions or influence your investigation. Because of these events, a complete solution is not possible until early in the afternoon, even if you know exactly what needs to be done. Physical evidence, also time dependent, is hard to come by, despite a multitude of objects.

Regardless of which of four principal suspects you attempt to convict, it is necessary to prove the motive, opportunity, and means. When you believe you have enough proof, you may arrest your suspect(s). A summary letter advises you of the result, ranging from dismissal by the Grand Jury, to conviction by the Trial Jury. Some endings come with shocking suddenness, while others are quite a surprise or contain a strange twist or clue for your next attempt. While some are simply variations of others, there is one "complete" solution, distinguished by a three-screen analysis of the crime by the author.

The game suggests the quality, feel, and humor of its *Zork* predecessors, from which *Deadline*'s flexible, multiple command parser has been adapted. The vocabulary and synonymous word recognitions are excellent, although there are a few "missing" words which a good detective would use; for example, Who, Why, When and Where. Then too, there is a fast sequence of events near one ending that is illogical, in that someone should have been able to be seen at a crucial point. Lastly, there is an obscure but fatal bug—don't shake the bottle known to be empty unless you have made use of the eight-scenario save/restore game feature.

The response time of the game is excellent, and the disk-interactive nature of the game is hardly noticed. *Deadline* will play on a 32K system, run faster on a 48K system, and really zip on a 64K configuration. While the puzzle quantity and difficulty level are moderate, the puzzles are quite involved and interactive, requiring more deductive logic than is usually called for in adventures. After seeing the many screens of possible responses and descriptions, perhaps the biggest single puzzle is, how did Infocom manage to get all that text onto one disk?

EARTHLY DELIGHTS

Datamost
$19.95
48K; II/II+/IIe/IIc

Overall Rating	B-	C-	*Challenge*
Documentation	C	B	*Creativity*
Value for Money	C	C-	*Vocabulary*
		5	*Save/Restore*

Earthly Delights is a two-sided, all-text adventure that's short on puzzles but enhanced by nicely done, highly descriptive text. You have inherited a painting, "Earthly Delights," which is very pretty but no masterpiece. When you are offered $75,000 for it, you become suspicious and refuse, only to have it stolen from you. Your lone clue is a matchbook cover from a Paris bistro that was found in your room.

You journey to Paris in quest of your missing painting, visit the Louvre, a sleazy bistro, and an apartment where you find the next set of clues. Then you're off to a chateau on a small island, where you start to learn about the mystery of the painting before continuing on to your final destination, Zurich. There, the balance of the mystery unravels with a surprising conclusion. Along, the way, you won't encounter many puzzles, and until you get to the very end, the puzzles are rather easy. The last one, though, is a toughie. The game is more a matter of visiting a number of thoroughly described locations, sifting the clues from the numerous red herrings, and just enjoying the well-written text displays in this involved game (which boasts some 127 mappable locations).

The parser is good, but the vocabulary is a bit on the weak side. You may save five saved-game positions to the disk at any time, and you may recall them whenever

you wish. All in all, *Earthly Delights* is an intersting game, largely due to its highly descriptive text and well-conceived plot. It is definitely worth your time.

ENCHANTER

Infocom, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
		A	*Save/Restore*

Mark Blank and Dave Lebling, creators of the *Zork* trilogy, have again joined forces and brought forth *Enchanter*, an all-text adventure worthy of its ancestry. You start as a neophyte wizard, hoping to be accepted into the Circle of Enchanters, armed with but four simple spells. Your wizened mentor, Belboz, has concluded that only an innocent fledgling can hope to succeed in dispelling the great evil wizard, Krill, and then only with inherent cunning.

Schooled in the basics of enchanting, you now must find and correctly apply the spells contained in the missing magic scrolls. Some locations are obvious, others may be seen in dreams, some are tough and need the help of others to obtain. The threat of a sacrificial death lies heavy over you, until you learn to accept your Karma for the betterment of your future. Indeed, the fourth scene from *Zork III's* Scenic Point will now be experienced in full context.

There is frequent humor to be found amid the expansive, but forboding text. The puzzles are imaginative and tricky, and several are downright tough. They are pleasantly interactive, and permit considerable exploration while you become a master enchanter, ready for the final assault on the Translucent Rooms and the Winding Stairs.

The multiple command parser, vocabulary and save-game capability, all hallmarks of Infocom, are here in all their glory. There are a few minor breakdowns of the parser when combining certain commands on one line, and there is one spot where the usually outstanding vocabulary should "reach in the hole" of its synonym recognition a bit further.

The quality and feel of *Enchanter* are such that few seasoned adventurers would have objected to its name being *Zork IV*, although there are no elements of commonality in the play itself. No higher compliment can, or need be made. This one is a must for all adventurers, but beginners beware!

FORBIDDEN QUEST

Pryority Software, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	B	C-	*Vocabulary*
Documentation	B	C	*Value for Money*
		10	*Save/Restore*

This all-text science fiction adventure casts you as the captain of a small spaceship that crash lands on an ancient planet. Your self-imposed mission is to check out a rumor regarding a lost civilization whose knowledge could help restore a healthy technology to the faltering Alliance of Planets. Before you encounter the abrupt ending with its screens of text describing what you've brought back, you'll find and use a number of strangely described objects, meet several aliens, survive a wild river, and restore an android who silently follows you around for the rest of the game.

The puzzles, not the most logical in the world, require you to carefully find the plethora of objects scattered around the ninety-eight locations of the game. The abundance of objects presents an inventory management problem unless you divine the proper location in which to leave them. You also create further problems for yourself if you guess wrong as to which objects you'll need in the next of the three discrete phases. I recommend frequent save-games, because in many cases you can't otherwise get back to an earlier location. After initializing a scratch disk from the program disk, you can save or recall any of ten saved-game positions at any time. The save-game feature gets high marks for supporting two-drive operations.

The game has an excellent command parser that permits multiple word commands, but suffers somewhat from a restricted vocabulary. It would be a real winner with better word recognition. Although you get killed off a few times, *Forbidden Quest* is light-hearted and interesting. Even experienced adventurers will scratch their heads a few times before netting all the 3,500 points buried in the game.

G.F.S. SORCERESS

Avalon Hill Microcomputer Games
$35.00
48K; II/II+/IIe/IIc

Overall Rating	C	Easy	*Challenge*
Creativity	B+	C	*Vocabulary*
Documentation	A	C	*Value for Money*
		1	*Save/Restore*

A science fiction, all-text adventure game, *G.F.S. Sorceress* marks the first of the "continuing saga of Joe Justin and Selena Sakarov" aboard the spaceship G.F.S. Sorceress. This time, they meet in outer space, where Justin (you) has been set adrift in a "regenerating" spacesuit to drift alone for the rest of his days following a trumped-up courtmartial. Unfortunately, the ship has meteors stuck in it, both fore and aft. You must make appropriate repairs before using the ship to find the evidence needed to prove your innocence.

An excellent story provides the background for the game, but unfortunately the game doesn't live up to the expectations it creates. Only the interest generated by the writing will keep most users glued to the machine to see how everything comes out. The game plays with painful slowness, surprisingly enough, because this Assembly language program loads quickly and is not disk interactive. Coupled with this you get seemingly endless sequences of opening, closing, and entering bunches of colored hatches. The game itself holds no clues—they all appear in the writing. This approach is carried to sad excess. All the evidence lies in four books, each of which refers only to a particular part of the Officer's Manual, one of the two background documents.

After getting the Sorceress in fighting and flying trim, your tasks take you to five planets, all conveniently named by the only destination buttons on the control console. Since Earth doesn't count until the very end, you can hit the other four in any order that appeals to you. As a hint, save Altair for the last. Each planet has about seven locations, all essentially strung in a series so that you need not map them. Two have only one object for you to find, while the third has four, all in plain view and relatively easy to retrieve. Altair's well done puzzle, however, differs from the others. You will probably have to trudge back to the ship several times, through the abominably slow process and required movement.

You can save only one game to a scratch disk, but you can make it or call it any time; three would have been just right. The vocabulary and parser are barely adequate for the minimal demands placed on them. The ending comes abruptly when you and your little black book return to Earth for a retrial and a big assist from Selena (who has appeared in only a handful of earlier moves). All in all, the game would have been a real dud were it not for its story; nevertheless, I look forward to the next of the series.

THE HITCHHIKER'S GUIDE TO THE GALAXY

Infocom, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
		8	*Save/Restore*

This well-done, witty, all-text adventure loosely follows Douglas Adam's bestselling science fiction novel by the same name. Reading the book won't help you solve the game's puzzles, but it may give you some insight into its improbable, hilarious events, and its rather off-the-wall wit.

You begin as Arthur Dent, a contemporary Englishman who awakens one morning with a dreadful hangover only to discover that your house is about to be destroyed. That's right, they're putting in a highway bypass and your house is in the way—the destruction orders in the package say just that. Coincidentally, your problem is similar to Earth's impending destruction by the Vogons for an intergalactic bypass, though you don't know that just yet. As you argue with the bulldozer crew, your old friend Ford Prefect shows up to help you out. You're soon off with Ford on a series of wild, unlikely adventures that take you through two spaceships, a new planet, and the minds of three other people.

The game feels much bigger than its twenty-eight mappable locations would lead you to believe. The puzzles are exceptionally logical, but extremely tough. I feel I should take exception to Infocom's rating this game "standard" rather than "advanced," as the interactive nature of the puzzles can trip you up very easily. If you don't do some things very early on, you simply cannot solve puzzles much later. There are many ways to get into a no-win situation, sometimes without even realizing why for many turns. Some of the puzzles are beautifully layered. You solve the first part, and find that your solution has caused several other problems—you initially did the right thing, but now you must do more. Acquiring the Babel Fish (which will help you understand all languages) is a fine example of this, and gaining access to the robot Marvin's quarters is a marvel of logical improbability.

The vocabulary and parser, as you've come to expect from Infocom, are great. Multiple words, multiple commands, adjectives, and adverbs are all generally eaten up with great relish (except when it's "Dark," a condition you'll find yourself in more than once). The eight-game save/restore function is still one of the best. It supports two drives and is exceptionally easy to call or use at any time. This is one game where you will use all eight, and maybe even wish that you had a few more.

Infocom's past is already a litany of outstanding adventure games, but in *The Hitchhiker's Guide to the Galaxy* they have outdone themselves. This game is one of the best adventures I've ever played. It is, without a doubt, a must for every serious adventurer. Packed with humor, clever puzzles, a superb vocabulary, and a fancy parser—what more could anyone ask for?

PLANETFALL

Infocom, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	B	B+	*Vocabulary*
Documentation	A	A	*Value for Money*
		8	*Save/Restore*

Planetfall is a science fiction all-text adventure in which you are an Ensign 7th Class of the Stellar Patrol. You soon find yourself marooned on a planet, uninhabited except for a robot named Floyd. Other than wanting to get back to your Galactic Union, the game's purpose isn't clear until much later, when a computer within your computer provides some much needed detail on various aspects of your newly found world. Along the way, you will find four subsystems to repair, and disease, hunger and radiation poisoning to overcome before one of the alternative endings makes everything clear. The different endings may indicate that you failed to do something necessary to achieve the optimum solution.

The puzzles are generally clever, but not quite as interactive as other Infocom games. There are several "choke points," particularly early on in the game, that block alternative actions until they have been solved. The vocabulary is quite good, as one expects from Infocom, although it seems that an excess of typing is required at times just to prove the point that the game has a multiple word parser. In some regards, the parser seems restrictive and unnecessary for precise syntax.

Planetfall isn't quite as tight a game as its predecessors; there are numerous rooms in this game that are just window dressing, in which nothing pertinent to the game can be accomplished or learned. To "compliment" this, there are a number of red herrings, which, with one exception, are not developed enough to seriously mess you up. Inventory management may be a problem, as there is a plethora of objects to manipulate, many of which are irrelevant and have absolutely nothing to do with the few that are the keys to the game. The puzzle is to determine which is which.

Floyd is a pleasant enough character to have around as a traveling companion, but somehow he's not quite the same show stealer as are several of the robots in *Suspended*. All in all, *Planetfall* is an interesting adventure, suitable for both the novice and for the experienced player, but not quite in the same league as some of the other recent Infocom releases.

SCOTT ADAMS' ADVENTURE SERIES

Adventure International
$39.95 (3 games)
48K; II/II+/IIe/IIc

Overall Rating	A-C	Medium	*Challenge*
Creativity	B	B	*Vocabulary*
Documentation	C	A-	*Value for Money*
		1	*Save/Restore*

(*Note on Grading*: This is a series of 12 games, and the ratings above represent an average.)

Scott Adams' *Adventure Series* are puzzle games, each set in a different fantasy adventure scenario. The all-text display states what you can see and where the visible exits are. Two-word instructions lead you through a twenty to thirty cell matrix, permitting manipulations of the various objects you encounter and leading to an eventual solution. The puzzle aspect, much more prevalent than in other adventure games, comes from using the objects to further your progress or avoid being killed. (Doesn't everyone know that a mummy lurching for your throat can be put to sleep by pouring water on his burning terra leaves? You did bring along the water, didn't you? The water was easy to find, but the empty object to carry it in was either somewhere else or hard to find.)

You may be able to solve a game in four to eight hours if you are lucky, clever, and take advantage of the "Save Game" command periodically to avoid having to retrace all the correct steps you made up to the point you were suddenly wiped out. If you enjoy resolving a myriad of interactive, thought-provoking exercises in deductive logic and have the patience of a

chess master, it's easy to become helplessly addicted to these challenging games.

The program responses are exceptionally fast and often humorous. Hints and clues, when given, are always obtuse. There are no graphics or sounds, and little use is made of color. As of this printing, the series includes 12 full length adventures, all devilishly devious, delicately intricate, and deceptively involved. One hopes that Scott Adams' imagination will continue to produce more in the series and at his current level of quality.

ADVENTURES 1, 2, and 3

Adventure Land. This game has the distinction of being the first of the good puzzle-adventure games. There are thirteen treasures above and below ground in this adventure's twenty-nine mappable locations. Some treasures just lie around for the taking, but you may end up a scratching and screaming lunatic before you can truly deal with the bear. Overall, not too difficult, and a good introduction to the tougher games in the series.

Pirate's Cove. You must magically travel between a London flat and an island on your way to locating two treasures. It offers a smooth storytelling style, and its twenty-five locations are populated by such wacky characters as a talkative parrot, a mongoose that becomes a failure in life, and a drunken pirate who continually wanders off. The task of building a ship on the first island is a good example of a well done interactive puzzle. It is roughly as difficult as *Adventure Land*, in slightly different ways, and fun to play.

Mission Impossible. You must stop the saboteur from bombing the Nuclear Reactor. To complicate matters, you are a walking time-bomb, and the saboteur dies before you get very far. Three differently colored rooms must be entered in a specific sequence in this twenty-one location game. There's nothing new or particularly difficult here, but things pick up in the last of the rooms, and the game can have either an explosive or rather watery finish.

ADVENTURES 4, 5, and 6

Voodoo Castle. You are assigned the not-so-simple task of removing a curse from the Count Christo. The puzzle takes place in the twenty-four rooms, hallways, and darkened dungeons of Voodoo Castle. There is a Kachina Doll, a Juju Man, a book for removing curses, and much more. There are a few tricky spots, but the puzzle is solvable. It is very well done and fast moving, with the best story line in the entire series.

The Count. While this game has only nineteen locations with which to contend, the new element of time has been introduced. Activities must be time-phased over several days and (parts of) nights in order to kill Count Dracula. It's slightly less complex in format than other games, but unique in that "things change" between night and day, and between successive days.

Strange Odyssey. You're on an alien planet in a damaged spaceship. You need to find five treasures, fix your spaceship, and return to home base. The first four treasures aren't too hard to find, once you figure out how to really move about in the twenty-two locations of this game. But finding the fifth treasure is a dog of a job, and it might be a pretty cold day before you get it, even after you learn what and where it is.

ADVENTURES 7, 8, and 9

Mystery Fun House. Spies have hidden secret plans that must be retrieved from a carnival Fun House, which consists of thirty-seven locations and a rather messy four-element maze. *Mystery Fun House* is devilishly clever, fun to play, challenging to unravel, and difficult to bring to a successful conclusion. It is tricky to get in, easy to get thrown out, and more than one door may prove frustrating. It's this reviewer's choice for the best of all twelve in the series.

Pyramid of Doom. Thirteen treasures are scattered about in an unexplored Egyptian pyramid. This twenty-six location game starts out simply enough, but gets very difficult in spots; one treasure, for example, is in a logical spot where you cannot see it, while others are guarded by a stone-hearted Iron Pharoah. Have fun. And good luck with the Purple Worm!

Ghost Town. The locale is an Old West ghost town, complete with saloon, hotel, telegraph stations, jail, Boot Hill, and a piano-playing ghost. Again, there are thirteen treasures to find. It's difficult in some phases, but unique in having a game within a game. Once you've solved this thirty-nine location adventure, try doing so again by finding the optimum sequence of moves that will earn you the maximum bonus. In a typical Adams' switch, there is also opportunity for revenge on the Purple Worm.

ADVENTURES 10, 11, and 12

Savage Island, Part I. If you aren't already familiar with this Adventure series, then this game isn't the one to start with. This one is for aficionados who easily solved *Fun House* and casually breezed through *Ghost Town*! Adams' saga is more devious, treacherous, involved, tricky, and underhanded than ever. *Savage Island* is a long succession of extraordinary puzzles, and entails considerable retracing of steps in and around the island. The object is to obtain the one "password" to permit entry into Part II of this game.

Savage Island is more intricate than most games, and some parts move quickly and easily. The difficulty lies in getting to the easy part, which follows one of the toughest and most intricate sequences that Adams has yet conceived. To help you get into the tough part (before you reach the dinosaurs, UFOs, pirates, and force fields), remember that some sickly animals can be cured with a dose of salts.

Unfortunately, Adams has somewhat flawed a potentially perfect masterpiece by inhibiting the save-game feature during the early, surprisingly difficult part of the game. This, coupled with two very dangerous killers who appear at random (like the Ice Hound of *Strange Odyssey*), often prevents you from getting back to the place you had previously been in order to deal with your tormentors. The resulting frustration kills much of the interest and perseverance required to solve any Adams adventure. It can be done, however; and with the restoration of the save-game aspect, *Savage Island, Part I* could become the type of fun and challenging adventure enigma to lead this excellent series.

Savage Island, Part II. The second part of this game starts out with a bang, so to speak, while displaying the admonition that "Part I was a piece of cake compared to what you are about to go through." Playing was so tough that it required thirty minutes of struggling just for this reviewer to survive the first move, another thirty minutes for two more moves, and another three hours to get up to five moves! Note that Part I must be conquered in order to gain the necessary password to get into Part II (although the reason for this isn't clear, since the games have relatively little in common, except for the Pirate).

Golden Voyage. This game is another matter. It's one of the easiest of Adams' puzzle games almost to the end, and then it becomes only a little harder but a lot more interesting. You are given three days to find the potion required to restore the aged king's youth. It runs a bit slower than earlier games, and as a consequence the upper screen display is quite jerky in updating. The reason for these deficiencies may well be that Adams has used a common assembly language shell for all his adventures, resulting in certain execution inefficiencies, at least in this particular "patched-in" game.

In general, newcomers to Adams' puzzle games would be better advised to cut their teeth on earlier editions; although *Golden Voyage* is close to being complex enough to provide the necessary "training." Even then, the Savage Islands are almost too tough, except for the dedicated and somewhat masochistic expert adventurers.

SEASTALKER

Infocom, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	Medium	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
		8	*Save/Restore*

This all-text adventure resembles *20,000 Leagues Under the Sea* and targets the younger set and beginning adventurers. It's almost a shame that Infocom had to dilute an outstanding story line by cutting back on the plot complexity and puzzles to match their target audience.

At the outset, you, the world famous inventor, receive a call in your private lab from Commander Bly in the top secret Aquadome. She reports a strange attack by a monstrous sea creature named the Snark and asks your help. After resolving a few minor puzzles in your lab, you put out to sea in the experimental submarine, Scimitar. You must solve a life-threatening puzzle en route to the Aquadome, where you encounter an interesting bit of intrigue. Someone tampers with the oxygen unit in a strange sort of lover's prank. Someone else is a saboteur whom you must find before you leave. You must learn to track him efficiently, because if you dawdle, the return of the Snark will send you scurrying for your saved-game position. Finally, when properly equipped, you set out to sea to deal with the Snark and a baddie named Thorpe who has designs on one of your employees.

The game consists of just twenty-nine locations, not counting the harbor and sea, where some of the action takes place—a bit on the small side. The puzzles and general story line are excellent, but the game includes slugs of internal clues for the embryonic adventurer. Yes/No quizzes aid you in obtaining both information and needed equipment. As always in Infocom games, the vocabulary and parser are excellent, but surprisingly, they have disabled Take All. However, they haven't tampered with the save game; you still get eight positions which you can call at any time. The game also supports dual drives.

Seastalker is a must for any beginning adventurer and will no doubt hook a number of people on adventuring. Although a bit too tame for a seasoned adventurer, the game, nevertheless, treats you to a potentially powerful puzzle and story line.

SORCERER

Infocom, Inc.
$44.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
		8	*Save/Restore*

This all-text adventure picks up where *Enchanter* left off. You wake from a bad, but realistic, dream to find yourself a member of the Circle of Enchanters despite your lack of experience. Belboz the Elder has disappeared and your investigations soon discover that he was working independently to overcome an evil force so great as to threaten the world. As it turns out, you must find Belboz and defeat the evil Jeearr. You start out knowing seven spells; you need to find nine more spell scrolls by hook, crook, and logic.

A relatively large game, *Sorcerer* consists of 106 mostly underground locations. While the text doesn't equal the glowing expansiveness of some previous Infocom games, it's still quite good, and the puzzles remain as imaginative works of art. Amazingly enough, Infocom has succeeded in creating an imaginative maze of twenty-eight (or is it fifty-six?) locations, not difficult to solve once you've figured out how. Other puzzles will have you talking to yourself—you'd better say the right thing. You get killed easily, but each occasion teaches you how to avoid repeating that fate. Oblique yet helpful hints abound in dreams and in a spell that foretells the future.

The difficulty factor was well chosen: not impossibly hard nor too easy, an excellent blend for even a first time adventurer with a logical mind, particularly since it remains free of unfair guesswork. Devotees of adventures may kill for a copy. The best news comes at the end. In the concluding screens of text, when you anticipate getting dubbed successor to Belboz, the third and concluding game in the series is prophesied. If it's anything like its two predecessors, it's definitely on my wish list.

SUSPECT

Infocom, Inc.
$44.95
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Documentation	A	A	*Creativity*
Value for Money	A	A	*Vocabulary*
		8	*Save/Restore*

In this all-text adventure you're a reporter covering a gala society Halloween party during which the hostess is murdered. Someone has done a good job of framing you, and unless you find some evidence to the contrary, you will be arrested and convicted of the crime.

The game has a dozen characters whom you can converse with, follow, and acquire information about. Due to the number of characters and the game's sixty locations, the solution is rather difficult. It helps to intelligently deduce whom you should follow, as well as when and whom you should ask what. More importantly, you'd better be in the right place at the right time or unfortunately, you'll find yourself at a disadvantage.

You won't find all that many puzzles in this game, and the specific solution can be quickly entered into the computer. The game is made more difficult, however, by the lack of clues or a running score to tell you if you're on the right track. An awful lot of things occur early in the game, and if you miss out on them, you will be in for a long and frustrating experience.

One hint: if you miss finding a key piece of evidence by 11:10, you'll be placed in a no-win situation, so you might as well throw in the towel and start all over again. Also, the murderer isn't whom you'll probably suspect, and the actual solution will surprise you. As always, Infocom's parser and vocabulary are superb, and the seven scenario save-game capability is still the best on the market.

Suspect is larger than both *Deadline* and *Witness* put together, and nearly as tough as *Deadline* (though for completely different reasons). The game's principle difficulty involves figuring out where to be—and when—so that the key evidence falls into your hands.

SUSPENDED

Infocom, Inc.
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A	A-	*Vocabulary*
Documentation	A	A-	*Value for Money*
		8	*Save/Restore*

Suspended is a Science Fiction all-text adventure game in which you are the central mentality of a planet. Normally, three underground filtering computers keep conditions stable and under control. In an emergency, you may manually control the filtering computer functions to minimize surface casualties, while you repair the damage that woke you from your 500-year sleep. Should the populace suffer drastically while you attempt these repairs, "talking mechanisms" will quickly replace you.

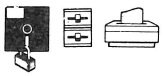
Each robot perceives his surroundings differently; thus, each robot's report regarding the contents of a given room may be wildly different. Only Iris can see, only Auda can hear, and Sensa perceives the state and patterns of electromagnetic energy. Waldo has a great gift of touch and is handy at fixing things. Whiz can get clues for you from his four-computer peripherals. While not infallible, Poet can touch an object and tell if it is working or not; his "way-out" reports give him a fresh personality that steals the whole show.

The few puzzles, complex and highly interactive, must be solved in a minimum number of moves. The initial puzzle is pretty obvious: Iris can't see. Subsequent puzzles are not so obvious, except that an errata sheet (needed to explain a bug) advises you that some filtering computer cables must be replaced. Sadly, only one puzzle requires the use of two robots working together; this is regrettable, considering the potential of the concept. After rebalancing the repaired computers, you receive a two-screen conclusion summarizing the casualties and move requirements. You also get a relative efficiency score of one to seven and an appropriate reward, ranging from being burned in effigy to being considered for a home in the country and an unlimited bank account.

The best strategy is to march each robot around and discover his limitations and visualizations; after this, the game will start to make sense. Use the computer peripherals to get information on the objects that are encountered. Then, when you attempt to "solve" the game, watch for opportunities to conserve moves; for example, if you need two robots to arrive at two locations at the same time, order the one farthest from his destination first. As new robots come into play, those commanded earlier will continue toward their specified goal, advising you when they arrive.

After you get a grade of three (savior of the planet) or four (a candidate for a frontal lobotomy), other levels of difficulty await. In Advanced, events move faster and only five of the robots are available to you. In Configure, you define the starting setup. You can "cheat" a smidge by starting with Iris fully functional and your robots better positioned. In the Impossible mode, it's two moves and zap! To add variety to replays, the computer reset codes change from game to game, or during the game if you try to cheat. A real challenge for the replays would have been to change the color or lengths of the four replacement cables which can be found among the eight used in the system.

Mapping the 61-room complex is not necessary; a nifty map board is supplied. Just take good notes on what each robot sees in each room. The game shares the superlative parser and save-game feature of the other Infocom adventures; the latter should be used frequently to promote efficiency. Note that a robot must have the "attention" of the area which you wish to investigate more closely. In light of this fact, the fine vocabulary is occasionally marred. *Suspended* has a superb plot, features, and concept; however, the game has not exploited its concept to the extent that it could have.



THE WITNESS

Infocom, Inc.
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	A	B	*Vocabulary*
Documentation	A	C	*Value for Money*
		8	*Save/Restore*

The Witness is the second in Infocom's series of all-text mystery adventure games. Following *Deadline* as it does, it is only natural to compare it to that near-classic. The scene is Los Angeles in 1938, where the wife of a noted millionaire businessman has taken her own life. Your alter ego is a police detective, summoned to the residence of the tragedy by a telegram from the businessman who now fears for his own life at the hands of his wife's vengeful lover.

Before long, you have a murder on your hands, committed before your eyes, and your task is to bring the perpetrator to justice. Whodunnit—the Lover, Butler, or Daughter? It evolves that all three may have a motive for the killing. You must question the suspects, search for physical evidence, piece your case together, and arrest the suspect. As with *Deadline*, there are

several endings, though none are as satisfying as in the original. There is but one complete solution.

The implementation techniques of Infocom's other games have been carried forward with their excellent parser, game-save, and recall capabilities. The imaginative text and expansive, detailed prose, another hallmark of Infocom, are present in full force, making the game a lot of fun while it lasts. The trouble is that it doesn't last long enough. The game starts falling into place as soon as an obvious object is examined, and resolves itself completely when the object is checked out. Part of the game's brevity is because there are only four characters, and it is difficult to develop a real case against several of them.

The puzzles are imaginative, detailed, and reasonably interactive, but there are not enough to contend with. The story line holds your interest and is well done as far as it goes. The vocabulary is also excellent in most regards, but it is flawed by the omission of the key words associated with the strong Asian theme that is dominant both in the house and the documentation's newspaper article. While these cultural differences have no real bearing on the game, they could have been the basis of an excellent idea that never came to life. In particular, the character of Phong could really have been brought to life.

ZORK

Infocom, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A+	Hard	*Challenge*
Creativity	A	A+	*Vocabulary*
Documentation	A	A	*Value for Money*
		8	*Save/Restore*

Zork is *the* definitive adventure game. Only the original *Adventure* program and the Scott Adams' series are comparable in challenge and complexity. It has the monstrous scope, fundamental tenets and beautifully descriptive prose of *Adventure*, plus a complex enough "puzzle" structure to warm the heart of any Adams fan.

The scenario is familiar, but the specifics are totally new and different. Not surprisingly, one starts at a deserted house which leads (in hopefully short order) to a cavernous underground complex, replete with varied and sundry treasures, a hungry Cyclops, an audacious Thief, a testy Troll, enchanted items (like mirrors and certain knives), an underground lake, dam, and a river, to say nothing of the coal mine, chapel, maze, and on and on ad infinitum, even unto the very Gates of Hell.

The all text, silent display is neatly formatted and scrolls very well. The vocabulary is out of this world, by far the most extensive yet encountered. Compound and multiple commands are accepted and individually acted upon: for example, "Take all but shovel and pump. Enter boat. Examine Scarab" is a valid, single command line. It will even answer a few abstract questions such as "What is xxx?" and "Where is yyy?". Through it all, the speed of the game is satisfyingly fast. Well conceived system commands permit diagnosis of your state of health, control over the degree of text verbosity, enabling/disabling a printer from within the program, and saving a game's status (only one) to a separate disk.

Zork will require at least the same amount of time (probably more) than was required to achieve a perfect score in *Adventure*. For those of fainter heart and lesser patience, Infocom's well written documentation advises that a price list is available for various hints and maps. But whether you tough it out or not, the best news is that this is only Part I!

ZORK II

Infocom
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A+	Hard	*Challenge*
Creativity	A	A+	*Vocabulary*
Documentation	B	A	*Value for Money*
		8	*Save/Restore*

Zork II comes reasonably close to filling the rather large shoes left by the first *Zork*. It continues the all-text adventure, starting in the Stone Barrow where *Zork I* left off. There is another 400 points worth of treasures to find and tricky activities to accomplish before achieving the primary mission of becoming Master of the domain which is currently under the senile control of the Wizard of Frobozz. Whereas *Zork* was quite faithful to the original mainframe *Zork*, significant changes have been included in *Zork II* to the extent that it is almost a "new" game for players expecting the inclusion of the "second half" of the mainframe game. The changes are revealed in the inability to return to the White House, although you may get a final glimpse of it, briefly, and from afar.

Zork II has the same outstanding command flexibility, wry humor, and word recognition of *Zork*. A well-conceived addition incorporates eight game scenarios which may be saved and quickly recalled at any time, whether you've been killed or not. The overall interest-holding ability may not be as intense as the original,

possibly because of a certain jaded attitude acquired from too much quantitative adventure game-playing by this reviewer. The initial phase of the contest seems to drag a bit, until the Dragon is conquered and a riddle is completely solved. An especially interesting challenge, at which time a "save" is suggested, occurs at the point in which the demon is ready to do your bidding.

In comparison to *Zork*, this game is somewhat smaller (by about 75 rooms) and has only one small but unmappable maze, which presents one of the more difficult puzzles. Even after you amass your 400 points, there is still a final puzzle to solve before you become a Superior Adventurer. At that point, you can look forward to the next part—*Zork III*!

ZORK III

Infocom, Inc.
$39.95
32K; II/II+/IIe/IIc

Overall Rating	A+	Hard	*Challenge*
Creativity	A	A+	*Vocabulary*
Documentation	A	A	*Value for Money*
Graphics	None	8	*Save/Restore*

Zork III completes the classic all-text adventure originally written in 1979 on the DEC PDP-11. Like its predecessors, there is a considerable amount of "new" material incorporated that's not present in the mainframe version, all written in the graphically imaginative style with which even the Apple's Hi-Res pages cannot compete.

When *Zork III* begins, you are at the bottom of a long staircase (which should strike a responsive chord to those who have completed *Zork II*) equipped only with your lamp and your imagination. At the end, you are in the Treasure Room with all of the treasures of Zork at your disposal, including a controlling interest in Frobozzco International. In between, you may hear, or see and hear, the fabled Dimwit Flathead, glimpse into a ritualistic scene from a to-be-hoped-for *Zork IV*, and speak with—or even command—the omniscient Dungeon Master himself. All along the way you will enjoy the excellent save-game implementation, command parser, and vocabulary characteristic of Infocom programs.

Zork III, with its 58 mappable locations (excluding the 8 by 8 matrix "Royal Puzzle"), is slightly smaller than its predecessors; but it is rich in subtle detail. It is perhaps the most entertaining of the three, with very logical, highly interactive puzzles. It is possible to successfully complete the game and still miss much of this detail: you may never find that peculiar set of conditions which can cause a sign to change in its inscription, hinting gently that you may have gone astray. There are numerous, amusingly tongue-in-cheek responses to inputs that otherwise get you nowhere. Overall, the game is somewhat more difficult than *Zork II*, due to several individually difficult puzzles, and also because of their high degree of interaction. You can easily find yourself in a no-win situation, a condition you may not realize until the game is replayed, making alternate life-and-death decisions which are available only once.

The conclusion provides an unexpected and novel twist, but to get that far requires an equally unusual approach as far as most adventures are concerned. Don't count on the seven point score system's giving you any real guidance as to your true progress. It is relatively easy to have all seven points and yet find yourself in another no-win situation. The points, like other elements of the game, only prove that things are not always what they seem. Indeed, the toughest puzzles award no points, and several toughies remain unsolved even once all the points have been awarded.

Zork III represents a highwater mark for subtlety and logic, and is a four star must, not only for previous Zorkers but also for anyone who enjoys adventure games or pleasurable mental stimulation. The game is a separate and complete game unto itself, requiring no knowledge of *Zork I* and *Zork II*. However, for maximum enjoyment and imaginative continuity, it is recommended that they be played in sequence

Graphics

ADVENTURELAND SAGA #1

Adventure International
$39.95
48K

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Vocabulary*
Documentation	A	C	*Value for Money*
Graphics	B	4	*Save/Restore*

Adventureland Saga #1 is Adventure International's re-release of its original all-text adventure game which has been spiffied up with Hi-Res graphics, and much improved documentation. Several command option keys have also been added: the "Z" key toggles the graphics mode on and off, speeding the game considerably and producing an all-text version identical to the original release. They've added a four position save-game option, as opposed to the single position on the original version. It is a bit messier to use, however. The documentation is complete with at least a partial list of recognizable key words—a major breakthrough in adventuring.

As before, the object is to resolve the puzzles so that you can find and retrieve thirteen treasues, only some of which are easy to locate. A significant novelty (not evaluated), is that the "V" key toggles a Votrax (if you have one), to provide spoken feedback from the game. The same key was used, however, to toggle a printer and get a running hardcopy of the game text. A dump of the graphics is also possible, provided you have a Grappler or Microbuffer card and an appropriate printer.

The graphics are pleasant and colorful, but are often painfully slow if a number of shape-table objects must be drawn and filled in. "Inventory" is a particularly slow process, after the novelty of watching a graphical "bag-dumping" wears off. This recalls the old expression of "Z" before "I" (or is it "I" before "E"?). The two-sided disk boots off one side, and eventually plays the game there. The flip side of the protected disk, through which one must pass, carries a plethora of AI promotions, including long demos of three games and a multi-screened graphical statement against pirating/unauthorized copying, complete with a dour-visaged Scott Adams staring balefully from the CRT.

If you have played the lower priced text version, you'll find the graphics add little to the enjoyment of the game. Personally, this reviewer preferred the original, as the graphics detract from the degree of imagination that is needed to be successful. If you haven't played the classic AI text adventures, then you'll have a treat in store—graphics or no, these games are a must for any serious adventurer.

AMAZON

Telarium Corp.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C	B	*Challenge*
Documentation	C	A	*Creativity*
Value for Money	C	C-	*Vocabulary*
Graphics	A	10	*Save/Restore*

Amazon is a four-sided, hi-res adventure with a lot of text and graphics screens. Your mission: to find the lost Amazon city of Chak and its cache of dark emeralds which will revolutionize computer technology. The last expedition was wiped out by unfriendly natives.

Your first stop is the Institute in Miami where Professor Beneker has the necessary map. Unfortunately, he is killed an hour before you arrive. While you don't find the map, you do adopt the Professor's talking parrot Paco, who becomes your traveling companion. Then it's full speed ahead to the Amazon, where you encounter headhunters, corrupt government officials, freezing mountains, alligators, erupting volcanoes, and earthquakes. Piece of cake, you say?

The graphics are beautiful, well-detailed, and colorful. The fill speed is good. You'll go on for some time on a text screen basis, suddenly returning to the hi-res mode. Several junior grade arcade games are thrown in, and you'll be spending a good deal of time communicating with NRST headquarters by means of the computer that fortunately is in your inventory.

The vocabulary is adequate, but on the weak side. The puzzles at the lowest of the three difficulty levels are not too complex, but you will get killed off with annoying regularity. The next higher level has a few extra puzzles thrown in, while the highest level sees you killed off at nearly every turn. Unfortunately, you must suffer through the reboot cycle when you get killed. Since there are four disk sides and a separate save-game disk, things may well become a disk-swapping nightmare. You may save ten games to a scratch disk, and *Amazon* will support two drives. You can restore a game at any time—assuming you haven't been killed, that is.

The story line is interesting and you'll find a sprinkling of light humor. *Amazon* was written by Michael Creighton (*The Great Train Robbery, Marooned, The Andromeda Strain*) specifically for Telarium's interactive literature series. I recommended it for intermediate adventurers, but not for beginners. *Amazon* is very playable, but it is definitely a frustrating entertainment program due to its propensity to continually kill you off, and the ridiculously long reboot cycle.

CASTLES OF DARKNESS

The Logical Choice
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C-	Medium	*Challenge*
Creativity	C	C	*Vocabulary*
Documentation	D	C	*Value for Money*
Graphics	B	7	*Save/Restore*

Castles of Darkness, an uninspired and humorless Hi-Res adventure game, moves ponderously and develops even more slowly through its eighty-five locations, including two castles. You must overcome the might of the evil wizard, Grimnacht, by discovering the power behind his curse. Some of the rooms hold treasure, others fixed-position monsters or clues, and some nothing at all. When done, you will have amassed 200 points and incurred sore fingers from constantly typing all the letters of words like "explore" and "inventory." It doesn't help your finger fatigue to have to search for verbs that the game will recognize, despite its contention that it has a vocabulary of more than two hundred words.

The game has a degree of animation and an occasional spoken word, like "beware," but the graphics leave much to be desired: rooms are almost unchanging in form and content, while objects are of microscopic size. The game requires constant disk interaction and at least thirteen seconds to move from one location to the next. You can save up to seven games on the disk at any point during play, but you hardly need this feature because you really have to work at getting annihilated. On the other hand, you can restore a saved game only at the outset, after going through the lengthy boot cycle.

This adventure's worst feature is that when you enter each new location, you see only four of the five lines of the text at the bottom of the screen, which forces you to flip to the text mode to read the description. In fact, the combination of slowness and the limited vocabulary and response choices overshadow a rather good puzzle design. You can purchase a clue sheet for $2, but a list of recognized verbs would help much more.

CRANSTON MANOR

Sierra On-Line Systems
$29.95
48K

Overall Rating	B	Easy	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	A	15	*Save/Restore*

Cranston Manor (Hi-Res #3) is actually On-Line Systems' fourth Hi-Res Adventure game. It follows the traditions, drawing form and puzzle content of *Mystery House, Wizard and the Princess,* and *Mission Asteroid.* The object is to return sixteen treasures from the multi-roomed Manor so that the town can be returned to its former glory (actually, the conclusion extends congratulations and designates you a Class 3 Adventurer!).

It's not hard to get in the Manor and find the treasures, but there are a few sticky puzzles to solve, and they get stickier if you don't read the Kitchen's description carefully on your first entry! The game is the same general size as *Wizard and Princess*, but except for the town and grounds (where there is relatively little action), *Cranston Manor* is all indoors—upstairs, downstairs, and basement. Mapping is necessary as there are several interesting interconnections. The inability to reliably restore or restart a game after being killed off is an aggravating program bug; the computer will be totally hung-up and requires powering-down in order to get back to any of the fifteen save-game positions. One nice feature is the command "Init Disk" which provides a DOS 3.2 initialization process.

If you enjoyed the previous Hi-Res adventures, you will find *Cranston Manor* enjoyable, but perhaps not quite to the same degree. There are few surprises (excluding the fact that there are no bathrooms in the

Mansion). There is a feeling of being somewhat crowded within this game, despite its size. Unfortunately, some of the imagination and freshness which so marked *Princess* is also missing.

CRYPT OF MEDEA

Sir Tech Software, Inc.
$34.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	F	Medium	*Challenge*
Creativity	D	D	*Vocabulary*
Documentation	C+	F	*Value for Money*
Graphics	C-	9	*Save/Restore*

This humorless Hi-Res adventure game boasts rooms full of blood and gore but little else. You start out in a mausoleum and must traverse numerous rooms crawling with strips of flesh, decapitated corpses, headless and flea-infested dogs, mutants, and deadly jellied masses. All of them gleefully dispatch you in gruesome and morbid detail at speed zero, which further drags out your gory demise. Your objective evolves into simply escaping this underground horror house. When you complete this task, you get only congratulations and "Your game is now over." The game doesn't even end decently—it just sits there. You cannot move nor can you get any further information. You have accumulated a number of Experience Points (from getting killed, among other things), but you have no clue as to how you gained them or which actions resulted in more points. You cannot access your score from within the game.

The graphics are dull and simple, colored chiefly with pools of blood. The detailing leaves much to be desired even on the few figures you encounter. Fortunately, you can toggle off both graphics and sound, which speeds the game materially. The text is equally insipid and morbid, the vocabulary atrocious with no synonym recognition. The parser, allegedly multiple word, performs better as a standard two-word parser, perhaps because of the horrid vocabulary. It does help you out if you get close, saying "Try throwing XXX at YYY." When you see a "Butterknife" and try to take it, you learn "That object doesn't exist." (Try "Take Knife.") The puzzles are basically one on one, with no interaction. Find an object and use it once (except for the shovel, used twice). This forty-eight location game requires considerable crisscrossing. The puzzles are tough, largely guessing games with little logic to them. Some would be nearly insurmountable except for the merciful two section hints and answers to those hints found in the documentation.

You can make (and call) nine saved-game positions to a scratch disk at any time, but unfortunately the game doesn't support two drives. This sick game deserves an R rating for the content, but the quality keeps the scores low. It definitely does not belong in the hands of younger children, and hardly suits older adventurers, either. I'm surprised that a company like Sir Tech, with a reputation for quality games, would permit its name to appear on this game.

THE CURSE OF CROWLEY MANOR

Adventure International
$34.95
48K; II/II+/IIe

Overall Rating	D	Medium	*Challenge*
Creativity	C	D	*Vocabulary*
Documentation	C	D	*Value for Money*
Graphics	B	1	*Save/Restore*

This gory and humorless Hi-Res mystery adventure emphasizes the supernatural. As Inspector Black, you start in your Scotland Yard office (which you cannot leave until the phone rings). An officer (later found gruesomely murdered) summons you to Crowley Manor to investigate the murder of Lord Crowley.

The graphics are distinctive, crisply drawn, and colorful, but not overly artistic. From any Hi-Res display, the next keyboard entry flips the screen to an all-text page that shows the current six item inventory as well as a description of the location and a list of visible objects (manipulable, but not shown in the graphics). This technique speeds the display time, but takes some getting used to because no text history tells you what you just tried while searching for a valid combination of words. Any keyboard entry flips you back to graphics, even one that calls up the incomprehensible "Huh?" that appears all too often. While the game's puzzles aren't difficult as such, finding a combination of words to elicit a response is frustrating and tough.

The documentation alludes to a dynamic parser and extensive vocabulary, making it my turn to say "Huh?" The parser allows multiple commands and full sentences, sometimes demanding them. For example, when facing a plywood wall, try "Chop hole in wall" rather than "Chop hole," which gets the familiar "Huh?" Likewise, try "Get the Golden Key" instead of "Take the key." In effect, *The Curse of Crowley Manor* is a guessing game where you can easily get stuck in one location, looking for just the right word combination. It offers you no alternative or parallel aspects to work on,

look at, or from which to gain additional information. Fortunately, a good save-game feature minimizes the aggravation of oscillating between one command, getting killed, and having to restart. You can make or recall a single saved game from the protected disk, even after you've been killed or torn apart.

Adventure International should expand the internal documentation, which does list a few of the acceptable words. The disk has a demo, plus a four color bar calibration page to help you adjust your set properly to reproduce the 108 colors claimed. After considerable cranking on the color, hue, and brightness controls, two television sets and a color monitor all got their turn to say "Huh?"

DALLAS QUEST

DataSoft
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Documentation	C-	B	*Creativity*
Value for Money	B	C-	*Vocabulary*
Graphics	A	8	*Save/Restore*

Dallas Quest is a two-sided hi-res adventure based on the popular television series, Dallas. You are a famous detective who's been summoned to Southfork by Sue Ellen Ewing. Your mission is to find and return to her a map of a rich oil field. In the process, you'll journey into a South American jungle, visit a cannibal village, and encounter a variety of downright unfriendly animals. None of them, however, is as unfriendly as Sue Ellen's evil husband, J.R.

The puzzles in this thirty-nine location game are not the most logical in the world, and several are downright tough (just don't ever give away the Ring). You can use a Clue command which will sometimes give you the exact solution, other times a pretty good hint, and, on rare occasions, dangerous information. Maybe I'm asking too much, but it seems to me that a command offering hints shouldn't turn on you in your hour of need. It's quite possible to get into a no-win situation in this game.

The excellent graphics display fine likenesses of the familiar characters, and the game begins with a rousing rendition of the Dallas theme music. There is an excellent save-game capability that lets you save and recall eight games on the parent disk, without having to endure a long boot-up cycle when you want to re-start. On the other hand, the documentation and packaging are a bit skimpy.

In sum, *Dallas Quest* is a good all-around game. It is challenging enough for the more experienced, yet not too difficult for novices (except in one place, where you might try Give Eggs to Chief followed by Give Mirror to Monkey). There, I've gotten you past the hardest part.

THE DARK CRYSTAL

Sierra On-Line Systems
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Creativity	A	B	*Vocabulary*
Documentation	B	A	*Value for Money*
Graphics	B-	15	*Save/Restore*

The Dark Crystal is a two disk Hi-Res fantasy adventure, the sixth from On-Line and Roberta Williams. The game is based on, and generally faithful to, the movie produced by Jim Henson, of Muppet fame, who also wrote the story. The plot is exceptional, but having seen the movie is neither a help nor a hindrance in solving the game.

Jen, our Gelfling hero, is your alter ego. You control his actions in his quest to find and replace the missing shard of the Great Crystal, a deed which must be done at the instant of the triple conjunction of the Three Suns. The great prophecy states that only a Gelfling can accomplish this task, and Jen is one of only two who escaped the slaughter of his race by the evil Skeksis. Failure means that the Skeksis and their robot-like killers, the Garthim, will control their world forever. Success means both the end of the Skeksis rule and a return to peaceful harmony in the world of the Gelfling and Pod people. If he succeeds, Jen will live happily ever after with Kira, the female Gelfling, whom he meets halfway through the game.

The game's disk-interactive graphics, which employ two novel and exciting techniques, are good but not overwhelming. In the beginning, Jen appears a bit too often. In each frame, he is the starkly white character against the colorful, detailed background. Later, after Kira is found, she and Jen neatly overlay the same backgrounds that he had previously traveled alone. Other figures, also all white (presumably due to the overlay requirements), can also occupy the same backgrounds with Jen and Kira on certain occasions. Despite the large game area, mapping, while recommended, is not mandatory. There are no tricks or mazes in the regular, symmetrical layout. There are approximately 94 mappable locations at which actions

are possible. Also, about a dozen scenes, which automatically appear as a consequence of a previous action, serve as intermediates to the next location. This technique adds materially to both the flow of the story and the fast-action, "animated movie" feeling that comes through in the later phases of the game.

Some liberties had to be taken regarding the movie in order to improve the game's puzzles, which, while not particularly interactive or difficult, demand that you read the text very carefully and use a degree of imagination normally only demanded by an all-text adventure. Some objects and actions are neatly concealed. While you are not too likely to get killed off in the first half of the game, matters get stickier and more dangerous later on. Often only one move is permitted before unfortunate consequences take place.

The syntax permits only two words, but involved expression is not necessary. Similarly, the vocabulary is quite adequate and has good synonym recognition. Only in one spot—toward the end of the game, where several minor glitches are found—is specific word usage a problem (try "Use Hook"). Fifteen different save-game positions may be made to a scratch disk, which must be initialized from the game disk. While a game may be recalled at any time, it is necessary to reinsert Disk 1B if you get killed off. Combined with the sudden demand to insert another game side, there are often five disk sides with which to contend in a disk-flipping nightmare. This program is sophisticated in many ways; yet it's too bad that On-Line hasn't learned how easy it would be to optionally permit two drives to be used.

The Dark Crystal has little deliberate humor, but it's lighthearted, done in good taste, and fun to play. The game anticipates your actions and commands unusually well. Quite a number of descriptive responses to the hardest things add materially to making the game playable and interesting, although they have little bearing on the game's solution. The game is easy enough for beginners and captivating enough for more experienced adventurers. Despite a few rough edges, it is one of the best Hi-Res adventures to come along for some time.

EARTHQUAKE—SAN FRANCISCO, 1906

Adventure International
$34.95
48K

Overall Rating	C+	Medium	*Challenge*
Creativity	A	D	*Vocabulary*
Documentation	C	C+	*Value for Money*
Graphics	B+	1	*Save/Restore*

This two-sided, Hi-Res adventure starts moments before the big shake in San Francisco. You find a note telling you to deliver the wad of bills in your possession to a particular hotel if you want to see your wife again. This relatively straightforward task is suddenly complicated when your hotel room collapses around you. You emerge to discover chaos in the streets, fallen buildings and fires everywhere, and no transportation. You encounter trigger-happy and not too honest soldiers, must perform heroic actions, paddle around in Oakland Bay, get buried alive, and endure having a small dog piddle on you. The game contains forty-eight scenic locations, but gives the feeling of being larger, perhaps because of the frequent backtracking required. New items appear in old locations after you have met conditions in distant places. This leads to several interesting puzzle variations. Some of the puzzles are mildly interactive, but several in-series elements can take you to a dead end. A few give you only one shot at the answer before you get shot. Fortunately, the game restores itself quickly after your untimely demise. The game contains little humor or unnecessary violence; generally, it takes a breezy and light-hearted approach.

The graphics, although colorful and well detailed, take some time to fill and cannot be disabled. Like other current Scott Adams' games, matching the four color test patterns proved impossible with either a color monitor or a standard television set. Even so, I thought the coloring of the frames impressive and attractive. The screen flips from graphics to text mode whenever you push a key, making it impossible to review past commands. The multiple word parser does pick out recognized nouns and verbs, but totally ignores all modifiers. The vocabulary is terrible, the text quite sparse. All too often your entry calls up only

an insipid "Huh?" Climb and Look soon become mainstays of your vocabulary. The game provides a single save-game position to the protected disk, which you can use or call up at any time. The lack of other save-game positions doesn't matter because you don't encounter any irreversible puzzles or situations. The six-item inventory limit presents some difficulties, but hang on to your crowbar.

The puzzles, scenery, and theme make the game worth playing, if you can abide the parser, vocabulary, text, and format problems. It would prove a bit tough for beginners except for the rather obtuse, yet helpful, hint sheet included in the package. The game itself includes no oncreen hints, clues, or scoring. This one should keep the kids busy for quite awhile; even seasoned adventurers may scratch their heads at several points before heading for the hint sheet.

ESCAPE FROM TRAAM

Adventure International
$34.95
48K; Apple II/II+/IIe

Overall Rating	C-	Medium	*Challenge*
Creativity	C	D	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	C	1	*Save/Restore*

In this Hi-Res adventure you start and (hopefully) end in a spacecraft. When the game opens, you're crashing onto a desolate planet inhabited by an alien warrior, a friendly monkey-like creature, a bunch of earthling-eating Traams, and a few slaves. To leave the planet, you must solve a number of puzzles that seem unrelated to each other and the game. For the most part, the puzzles come in sequence, so until you solve one you can't work on the next.

Escape from Traam shares the same parser and poor vocabulary as its stablemate, *Earthquake—San Francisco, 1906*. Unfortunately, it doesn't share that game's interesting nature. The graphics look familiar and possess the same slow color fill, but are not as crisply drawn or well detailed. Once again, all too often you get the same response from the computer: "Huh?" You get a single save-game position to the protected disk which you can use or call up at any time. You really need a few more positions for this game because of a few locations from which you cannot easily return; you may find yourself in a no-win situation.

Little humor enlivens the sparse and bland text. The puzzles offer little difficulty except in two spots: one lacks logic and the other masks an object behind poor vocabulary. For the most part, you know what you want to do with the puzzles, but getting to there from here with the vocabulary is another matter. A hint sheet provides a degree of help, but the hints are either too obvious or too obscure. If you're hot to play another adventure, *Escape from Traam* will help you spend a weekend painlessly, but you won't have much trouble finding something better to do.

FELONY

CBS Software
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Documentation	A	B	*Creativity*
Value for Money	B	N/A	*Vocabulary*
Graphics	B-	0	*Save/Restore*

Crime marches on. No sooner have you solved twelve nasty murders in the industrial town of Micropolis (setting of *Murder by the Dozen*), than CBS creates Huxley, a sleepy college town which is experiencing a rash of baffling cases (twelve, to be exact). Should you buy this assignment, you will be faced with a variety of crimes, including some without corpses to supply the opening leads. Theft, vandalism, kidnapping, and a terrorist plot will challenge your skills to ferret out the felonious motives that lurk in the hearts of the citizens of Huxley.

If you have played the earlier game in CBS's Mystery Master series, you will be on familiar ground. This adventure, written by Charles Sanford Goldstein, is exactly like *Murder by the Dozen* in most respects. If you haven't ever played before, you'll find it quite easy to get oriented. Each of twelve cases occurs within a town of twenty-eight locations. With a case history firmly in hand, you usually begin at the scene of the crime. A location offers seven different choices of action: you may interview individuals; examine the contents of a room, clothing, or object; observe a suspect; or go to another location. Certain settings, such as the police station or the municipal building, offer other choices (check a lab report, telex the F.B.I., and so forth). Since this is not an interactive text game, your selection merely yields clue numbers that refer to sentences in the Clue Book.

Typically, no more than thirty minutes of solo play is needed before you will be ready to accuse a suspect and state the motive. You then compare your proposed solution to the actual one in the solutions booklet. Right or wrong, play stops at that point since you know the solution. The "second chance" offered by some adven-

ture games is a feature that's sacrificed here to the quantity of the cases—unless you get a non-playing second party to compare your solution to the one in the pamphlet.

Apart from the puzzle-solving challenge, you compete against a game clock which, in effect, measures your case-solving efficiency. If the solution is correct, you are designated as one of twelve types of sleuth, from "Total Turkey" to "Clairvoyant Cop." You can also compete against up to four other detectives or teams.

A thorough, sometimes humorous "Police Manual" supplements complete on-disk information, including optional map and case background screens. (There are no graphics apart from the optional map.) The separate clue and solution books insure that other teams can't get an edge by spying on your monitor. To achieve a high rating, it's in your best interest to limit the separate locations and selected options. You must also plan the sequence of locations so as not to waste time zigzagging around town.

The experience of playing this game, while not as challenging as all-text adventures, does mandate some note-taking on the supplied pad so as to plan your most advantageous location and investigation options. The pad lists all locations and has space for listing suspects, possible motives, case history, and interview/search notes. The interviews, unfolding in the Clue Book, sometimes yield unexpected characterization, such as the ethereal Lebanese physicist or the meat-headed captain in the last case. Apart from murders of different types (society, mob, revenge), the cases include kidnappings, vandalism, a stolen ancient tablet, and, most notably, a PLO terrorist plot.

In the case of the deadly terrorist, you must not only find the the mysterious terrorist and deduce his motives for setting four bombs off in Huxley, but also locate the disguised bombs before they go off seven "game hours" after the beginning of the investigation. The detective must start before the arrival of the necessary bomb-sniffing dogs and certain telexed information. Therefore, there is more pressure on you than usual, even if you've planned to use your alloted time wisely. (I didn't quite get to the last bomb and thus lost the case.) Unless you try to beat another detective or get a high rating by leaping to a solution. The normal game deadline is so liberal in other cases that it's negligible. If you do fail to propose a solution by the deadline, though, the program won't reveal the solution, so you may try again—a much welcomed feature.

I think CBS Software has developed a sound system of play for the Mystery Master series. It is easy to learn and flexible enough to permit different degrees of difficulty. Here's hoping they use this flexibility to put more cases of the complex-pressure variety ("The Terrorist," or "The Rothstadt Kidnapping," for instance) in their next offering—even if they have to include fewer than twelve cases on the disk.

The vendor has a fair guarantee policy: CBS will replace a defective disk free of charge within ninety days of purchase, and for five dollars after that warranty period has ended.

FORTRESS OF THE WITCH KING

Avalon Hill
$25.00
48K; Apple II/II+/IIe/IIc

Overall Rating	C	Easy	*Challenge*
Creativity	C-	C	*Graphics*
Documentation	C	C+	*Value for Money*
Graphics	B-	0	*Save/Restore*

Fortress of the Witch King is a fantasy game for one to four players. You must become strong enough to defeat the Wizard King after traipsing around a forty-by forty overall Lo-Res map and a ten-by-ten close-up Hi-Res shape-tabled map. The solitaire player seeks the gold to buy the men and material necessary to his quest. In group play, you seek gold and raid other players if you can find them. In either case, you get the gold by beating up poor, not-so-defenseless monsters, who may also possess objects that you need. Your warriors fight, scouts permit you to see the map areas and seek out your opponents, raiders raid your opponents, and clerics heal your warriors. Elves and dwarves may augment your forces, which may also include a wizard just for good measure. Regardless of how many of each type of men you have, you'll still need four magical items to succeed, each guarded by a mountain dwelling dragon. While you can tackle the Wizard King without them, your chances of success with less than three of the items are slim.

Game play is largely menu-driven, giving you the choice of viewing a map, using spells, or moving. Encounters take place in text, as does the King's sixteen room castle (a four-by-four grid). The final battle between you and the King also takes place on the text page. It is difficult to distinguish shapes on the map if you use a green screen or monochrome monitor, so I recommend a color display. After each turn you get the option of saving the game as one of seven scenarios, but you can call them up again only during the boot cycle. This provides no problem, because it is hard to get wiped out in this game even if all your warriors are killed. Sanctuaries of prayer provide even the near-destitute with men or food, letting you start building your strength again.

Although the menu approach calls for a lot of key pushing, it's a good game for kids under twelve. It does not offer much of a challenge to older gamesters. No surprises, puzzles, fast arcade sections, or anything fancy, just a good, old-fashioned slug fest in which you must get some items by hook or crook and go after the bad guy.

GELFLING ADVENTURE

Sierra On-Line, Inc.
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	C	*Challenge*
Documentation	B	B	*Creativity*
Value for Money	C	N/A	*Vocabulary*
Graphics	A	15	*Save/Restore*

Gelfling Adventure is a stripped-down version of *The Dark Crystal* intended for youngsters ages nine and up. Any child who can read can play this game alone, and younger kids could play with help. The game offers a good learning experience, but it's not much of an adventure.

Throughout the game, you use the space bar to position the cursor on one of three options, and press the Return key to confirm your selection. The choices include directions in which to move or actions to take. Unfortunately, there is no save-game capability, so when the nasty Garthim do you in, you must start all over again from the beginning. Fortunately, once you know the proper path, you won't run afoul of the Garthim too often.

Most of the graphics are screens from *The Dark Crystal*, with a few new ones thrown in to ease the transitions that effect short cuts from the original game. Mapping is made difficult, but not impossible, by the limited directional options (i.e., right or left) and occasional changes in the options when you return to a scene a second or third time.

This is a good game for teaching absolute beginners about the logic of adventure games. But if you've ever played an adventure before, you'll be sorely disappointed. If you're wondering how to get your young child interested in the Apple, *Gelfling Adventure* may just be the answer.

THE INCREDIBLE HULK

Adventure International
$29.95
48K; II/II+/IIe/IIc

Overall Rating	C-	Easy	*Challenge*
Documentation	C	D	*Creativity*
Value for Money	D	C	*Vocabulary*
Graphics	C	4	*Save/Restore*

Based on the popular TV and comic book series of the same name, *The Incredible Hulk* is a two-sided, hi-res adventure game. As the hero, you must periodically become the Hulk (by biting your lip or remembering a nightmare) to do deeds of strength beyond the capacity of your human body. As you go, you hunt for a total of seventeen gems. When you have them all and return them to the easily found repository, the game ends with a pronouncement from your Chief Examiner, whose role in the game is never really made clear.

The game is small, with only some sixteen locations, most of which are redundant. The puzzles are generally dull and insipid. All you need to do is pick up the gems that are freely lying about, and dig for a bunch of others. Only two of the puzzles deserve that appellation, and only one will really test you. It is possible to end up in a no-win situation, however, so save the game occasionally.

The graphics are pleasantly detailed, with several well-done screens of the Hulk doing all kinds of amazing feats. The text is nearly non-existent, however. You can easily save up to four games and recall them at any time. Even so, this game is disappointing in both quantity and quality. Even the graphics of the Hulk can't save it.

THE INSTITUTE

Screenplay
$34.95
48K; II/II+/IIe/IIc

Overall Rating	C+	B	*Challenge*
Documentation	C	C	*Creativity*
Value for Money	C+	C	*Vocabulary*
Graphics	B	2	*Save/Restore*

The Institute is a two-sided, hi-res adventure involving your attempts to escape from an insane asylum—surely an appropriate setting for die-hard adventurers! To accomplish your goal, you must figure out how to start dreaming; in your dreams, you will find the objects that ultimately lead to the Gold Key which opens the door to freedom. Four separate dreams

come to you sequentially; often, an object found in a later dream is needed in an earlier one, so you'll have to loop through the dreams several times.

The puzzles are interesting and rather well-done. The graphics are pleasant, but not outstanding. The game is devoid of humorous touches and is slightly on the grim side (recall the theme). For instance, you find the corpse of your father, but this discovery has little or nothing to do with game play.

The two-word parser is supported by a reasonable vocabulary, but insists that you "Look" at nearly everything before the objects that are at that location become visible and accessible to you. The screen layout flips from graphics to text when you press a key, and tells you what visible objects are there for you to work with, erasing evidence of your previous entry. A total of two save-game scenarios may be preserved, one on each side of the disk. Initially, two positions don't seem to be adequate for this game, but it turns out later that they are, since it's difficult to get yourself into a no-win or irreversible situation.

All in all, not a bad first game from a new software vendor. The conclusion promises another game in the near future, which I anticipate will be worth playing. Now, to practice my patience.

KEY TO THE STORM

Independence Software
$34.50
48K; II+/IIe/IIc

Overall Rating	F	Easy	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	F	F	*Value for Money*
Graphics	D	0	*Save/Restore*

This text-based adventure program has one small picture that acts more as a guide to your progress than as decoration. The publisher describes the program as a "variable-outcome, variable subject fictional work" where you choose individual words from the story presented. The program then uses these choices to change the story line. Supposedly, you can "win" by creating a certain sequence out of choices of the words highlighted in the text. The movement of the single picture tracks your progress toward winning. The publisher states that the "win sequence is geared to the user's taste for positivism, technology, and common sense."

Okay, that's what they *say*. What I found is a very slow, two-disk program which neither I nor any of my acquaintances of various ages and educational backgrounds could make any sense of. Apparently the story has nothing to do with the solution to the puzzle and the statement above provides the only clue to the winning sequence. In fact, the program came with no documentation at all. I obtained one typewritten sheet of "instructions"—which made no sense to me or anyone else—only by writing to the publisher. Of course, it is entirely possible that I am slow and hang around with a dumb crowd, but I spent several hours trying to solve this game and still do not know what I am supposed to accomplish! Unless you have a very high frustration threshold and truly enjoy word puzzles, I would advise you to stay away from this one.

LABYRINTHS OF CRETE

Adventure International
$29.95
48K; II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	B	D	*Vocabulary*
Documentation	C	B	*Value for Money*
Graphics	D	1	*Save/Restore*

Labyrinths of Crete is an adventure game in which two independently controllable characters, Jason and Hercules, represent your alter ego. Their mission is to recover the Golden Fleece. Doing so, they earn the respect of the inhabitants of Mount Olympus, are granted access to their exclusive area, and are praised with several bars of a pretty good arrangement of "The Hall of the Mountain King." Interspersed with the text are a few Hi-Res displays which suddenly appear, and fortunately can be turned off.

In attaining their goal, your characters will explore 108 locations in three different worlds, solve a plethora of puzzles, and encounter most of the gods, goddesses, and creatures of Greek mythology. A knowledge of the adventures of Zeus, Athena, Apollo, and Tantalus isn't necessary to the game, but neither will you learn anything about mythology (unless you are driven to look up the names in a dictionary).

The plot maintains your interest in the game despite the undeveloped, terse text. The puzzles, all in series and generally non-interactive, often have interesting twists. Not all need be solved if you are a good guesser, for all that you miss will be a clue to the next series element. The number of individual puzzles is staggering, but it is the few character-interacting puzzles that are the most fun. Jason will get into a fix—like being turned into a statue or a lump of gold—and needs Hercules to come to his aid. When the Minotaur strikes, don't despair for sorcery will help. When Hercules helps out an ungrateful Atlas, Jason must lie in wait.

Unfortunately, the game's inplementation falls short of its conceptual promise. The two-word syntax veils an atrocious vocabulary. The majority of the puzzles can be solved simply by Giving or Dropping the right object at the right location; most objects are only used in the world in which they are found. Often, an object will disappear when used properly, and with a few exceptions, each has only one use per location. The program does little self-checking for changes. Difficulties in inventory management can occur if you succumb to the temptation of getting a second copy of a once-used object. Indeed, poor Jason can get turned to stone any number of times if he is dumb enough to go back and try again. In the midst of the game, the single save-game capability seems insufficient; however, it's pretty hard to go wrong or get killed off (for good) or get into an irreversible situation, except at the Medusa.

The game is long, not too difficult, and reasonably fun to play. The new concept of interacting characters who combine their talents to solve a given puzzle opens new doors in adventure games and is bound to be extensively copied and exploited by others. Too bad that more wasn't made of it here, and that the finer points of a better vocabulary, a more developed plot, and implementation in general weren't up to the quality of the concept.

LANTERN OF D'GAMMA

Milliken Publishing Company

This hi-res adventure game uses math problems involving square roots and number bases to advance the action. For a more complete review, please see Math in the Education section of this book.

THE LION'S SHARE

Davka Corporation
$34.95
48K; II+/IIe/IIc

Overall Rating	C	Easy	*Challenge*
Creativity	A	D	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	A	26	*Save/Restore*

This two-sided hi-res adventure is set in biblical times. Your task: to penetrate the walled city of Babylon and signal the attack to the waiting Persian army. Seventy-six locations make up the two distinct sections of the game separated by your entry into the city. You need not know the Bible despite the biblical theme, because the puzzles are quite easy, as are the two riddles posed in the first section.

The names in the text descriptions create a welcome freshness and the graphics are very well done, among the best detailed that I've seen for some time. Mapping becomes a rather interesting exercise because going south from one location may, for example, require moving west to return. Many of the puzzles simply don't get in your way and are totally transparent if you are carrying the proper object. Often the solution to a puzzle lies in gaining access to an area by carrying (or not carrying) a particular object. The first phase doesn't hold too many puzzles, but things pick up in the second phase, especially toward the cleverly conceived ending.

Unfortunately, the game's implementation leaves a bit to be desired. The parser demands two words and the vocabulary is terrible. The game doesn't recognize many obvious words. In fact, one difficulty with the puzzles is finding the two specific words required for a solution. You may have the right idea and not get the words. In the vineyard, perhaps you should keep the word "stomp" in mind. A worse problem initially was the program's propensity to crash periodically, on my machine but not on others. Davka promptly dispatched a replacement disk and was most helpful in attempting to diagnose the sensitivity problem.

You can save twenty-six games to a scratch disk—something of an overkill. The boot cycle takes quite some time, interspersed with music. The game permits the recall of a saved position only at this point. When you save a game, you must suffer through the long booting process once again. Combine this with the ease with which you get killed off (another boot and music cycle) and you will have trouble keeping your interest in an otherwise interesting game. A better vocabulary and save-game capability would make this a winner.

LUCIFER'S REALM

American Eagle Software
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C-	Hard	*Challenge*
Documentation	C	C-	*Creativity*
Value for Money	C-	C	*Vocabulary*
Graphics	C	2	*Save/Restore*

In *Lucifer's Realm*, a two-sided, hi-res adventure, you find yourself in Hades, earnestly trying to escape to

better surroundings. You start out on your death bed; things get even grimmer as you go. You will run into assorted unsavory characters like Adolph Eichmann, John Wilkes Booth, Jim Jones, Lee Harvey Oswald, and last, but not least, Satan himself.

Satan believes Hitler is trying to usurp his authority and will let you leave if you can bring him proof of this devilish plan. Of course, that's only half the battle; you also need the permission of the Lord before you can go to Heaven.

There is very little that's new or interesting in this game. You will criss-cross the forty-nine locations of this program many times, as backtracking seems to be its middle name. You will also have to "Look" often—more than once in any given location to find all the items that you need. The puzzles are simple, though in general they're quite illogical, considerably increasing the difficulty level.

Lucifer's Realm is indeed a tough game to beat as there are few clues concerning what you must do next. The graphics are average, with a few good scenes to break the monotony. The two-word parser and the vocabulary get the job done, but they're nothing to cheer about. The protected disk has room for one saved game position on each side, which is not enough since you may find yourself in a no-win situation in several places.

Written by the same authors that wrote *The Institute*, this game is not as forgiving or interest-holding. If you're hungry to play an adventure, and in a bad mood already, then you're ripe for *Lucifer's Realm*.

THE MASK OF THE SUN

Broderbund Software
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	B	1	*Save/Restore*

The Mask of the Sun is an animated Hi-Res adventure set in the Aztec ruins of Mexico. You play Mac Steele, who must find the legendary Mask to cure a mysterious malady held in check only by a limited number of pills (which you carry at all times). You must explore two of the three pyramids on the two-sided game disk, but fortunately, this requires only two disk flipping interruptions. The game consists of approximately fifty locations, excluding mazes.

Mask of the Sun emphasizes animation, which, although far from smooth, initially captures your attention. You spend much time on the road in a bouncing jeep and even more time in a bouncing sort of walk through drab tunnels. The graphics are moderately well detailed and often colorful. Several of the animation sequences lend both enjoyment and a degree of reality in the responses to commands.

Only the graphics set *Mask of the Sun* apart, however. The vocabulary and word recognition are average at best. The puzzles are bland and generally of a one-on-one nature with little interaction, but you've had it if you don't have all of the necessary objects upon entering the final pyramid. The game does offer several challenges not often found in adventures. For example, you must hurdle a real-time, semi-arcade lava pit and correctly answer one of three riddles to get through two locations. By far the most difficult task is to unravel the mystery of the maze—actually two mazes separated by a room ready to fall in on your ears. Although manageable, both mazes require patience; you drop items to mark locations, but then you must "Look" for them at each location. The first maze is a really rather clever ten room maze, but the second sort of cheats and may well cause many players to give up out of sheer boredom. It has fifty-two locations, yet I can hardly recommend mapping because the next significant display evidently appears randomly. Unfortunately, it may take well over a hundred moves of bouncing back and forth through colorless tunnels (at twelve to fifteen seconds a move) before you need to wake up and pay attention again.

You can save or recall a game at any time, but you need a separate scratch disk for each scenario. This feature does not provide a two-drive option.

As an adventure, *Mask of the Sun* rates about average, but the mazes provide a higher than average degree of difficulty. Several well done animation scenes promise well for the game's future, but for the present, animation for its own sake in the form of herky-jerky traveling soon becomes irritating.

MASQUERADE

American Eagle Software
$34.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	C	Hard	*Challenge*
Creativity	B	C-	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	B+	6	*Save/Restore*

In this Hi-Res adventure with color graphics, you are a detective hot on the trail of the crime boss, Mr. Topp.

You must find your only lead in the seedy hotel room in which you have found the unconscious body of one of Topp's stooges. Before long, you find yourself in a zoo along with two strange characters, a bird that can do nice things for you, and a gorilla that can't or won't. The puzzles are just plain tough and well scattered throughout this fifty location game. Nineteen of the locations make up a simple maze. In numerous places, you can find apparently equal solutions to a puzzle; only one is correct. The others result in a game that you cannot win. You may have trouble even finding the "wrong" answer. Solve this little jewel and send the multidigited final score to Phoenix by June 30, 1984, and you may win $1,000.

The game is made even more difficult by a shadowy character with whom you cannot effectively deal. He's deadly with his randomly (but often) thrown knife. Wearing the mask helps for awhile, but not long enough. You'll get killed off numerous times, so make good use of the eight save games (say, every six moves or so). You can make and call up saved games from the program disk at any time.

The graphics are colorful and well detailed and the fill time, pleasantly quick. On the negative side, in addition to the random nature of your death by knife, you face almost nonexistent text and sparse feedback on anything that you look at or try. *Masquerade* offers neither humor nor gruesomeness and is rather bland as a result. It just doesn't reach the standards set by previous American Eagle adventures.

MERRY CANNED NIGHTMARES & DREAMS

Peachtree/Welcome Home Software
$29.95
48K; II/II+/IIe/IIc

Overall Rating	C+	Easy	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	A	C	*Value for Money*
Graphics	A	0	*Save/Restore*

Merry Canned Nightmares & Dreams is an educational game that teaches goal setting, problem solving, and logical thinking. The game features excellent hi-res graphics and nifty animation as your characters walk through their surroundings. Two to four players may play (a solitaire mode is not available) and the game might best be enjoyed by the eight to twelve age group.

Your animated alter ego, called a Dreamer, is located in a three-by four-square area along with five treasure chests, a farmer, a wizard, a friendly vulture, a child, two voids, and later on some evil spiders. You are given one of the chests and four moves to ascertain how many points and of what type are in that chest. Then you set your goals as to the number of fame, knowledge, wealth, and happiness points that you hope to gain. If you gain your stated goals, you win.

Unfortunately, things can go wrong in a variety of ways. You may run out of energy if you don't buy food from the farmer, in which case your accumulated points are transferred to someone else's chest. Two spiders may enter the same chest, and if you don't tell the vulture where to go to eat them, they multiply and chase you off the screen. Your task is further complicated by the screen's layout changing just about the time that you think you know who is where.

No save game feature is provided, and the game can be fairly long. Play is very easy. On each move, you are permitted to deal with the character in your present square, or move one square away to deal with whatever is there. Moving next to a character results in a brief menu appearing at the bottom of the screen. You make your choices with the arrow keys and hit return. The results of your turn are displayed on the point scale which shows the change in points awarded, not the total. The Wizard can tell you exactly how many points you have, although he disappears quickly.

Despite the simplicity of play and pleasant graphics with animation, the level of difficulty seems a bit on the high side for the very young. They also may have trouble with the real-time arithmetic requirements and the ease with which you can be beaten.

MIND SHADOW

Activision, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C-	Easy	*Challenge*
Creativity	C+	C+	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	A	10	*Save/Restore*

Mind Shadow is a two-sided, hi-res adventure in which you find yourself on a desert island, unaware of who you are or how you came to be there. Your primary mission is to regain your memory. In the process, you'll board a sailing ship, visit England, and fly to Luxemburg.

The puzzles are very straightforward and generally quite simple. Even so, typing "Help" often brings the aid of a friendly Condor with a dead-give-away clue. The graphics are excellent, well detailed, and colorful. The screen-fill speed is exceptionally fast. You save games onto the game disk, which also has Quicksave

and Quickload features that save and restore your last position incredibly fast speed. It is one of the fastest save/restore operations I've encountered.

The game plays easily, but the ending is a bit weak. It leaves you without any further puzzles to solve or places to go and no hint of a resolution . . . that is, until you start thinking about the things you've learned. The game is a pleasant diversion for the experienced adventurer, but not a real challenge. The on-disk tutorial tells how to play an adventure and gives several screens from a companion adventure, *Tracer Sanction*, which is a bit better game.

MURDER BY THE DOZEN

CBS Software
$34.95
48K; Apple II+/IIe, Franklin

Overall Rating	B	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	A	B	*Value for Money*
Graphics	B-	2	*Save/Restore*

Micropolis seems like a nice town—until a rash of murders sweeps through it, that is. In *Murder by the Dozen*, you work for the Micropolis Police Department. You must find the murderer in each of twelve mysteries, as well as enough evidence to build a strong and accurate case against the accused. Up to four players can play detective, either individually or in teams. You get a clue book, some notepaper with a map of the city, and a solution book. The solution book employs a clever system to guard against casual cheating: You can't read the solutions without a special plastic overlay.

Once you have the details of the case, you examine clues and question witnesses. Each turn offers seven choices, three involving interviewing people, three involving searching for or examining clues, and the last one allowing you to go elsewhere. The answers to each of the first six choices consist of numbers that refer to clues in the clue book, often reading simply "No Clue." Each clue costs you time, as does movement from place to place. The time you take to solve the case determines your status as a detective. The ratings range from Lucky Guesser to Innocent Bystander.

Looking up the numbers in the clue book keeps the answers confidential for competitive play, but it makes the game somewhat slow and cumbersome. Likewise, despite the quality of the graphics (including the Hi-Res map of the city), they do little to enhance the game. You already have a hard copy of the map of the city, so why wait for the Hi-Res screen? I'd call *Murder by the Dozen* primarily a text game for just this reason.

The mysteries themselves, although fun, don't offer much of a challenge. It took me half an hour or less to solve each case, mostly because I had to collect the evidence. I generally knew quite soon who the murderer was. One problem: To test a theory, you must read the solution. If you guessed wrong, too bad, because now you know the right answer. I wish the computer could tell you if you guessed right or wrong so that the game wouldn't come to a screeching halt with an incorrect or partially correct solution. I have a bigger complaint, however. Once you have solved the mysteries, why play the game again? The mysteries don't change. Of course, if you're a perfectionist you can retrace your steps to achieve the World Class Detective rating, but otherwise, why bother?

This hybrid game combines merely decorative graphics with text adventure, but it has no parser and offers only easy puzzles. Nonetheless, despite its shortcomings, *Murder by the Dozen* has personality and I enjoyed playing it. The whole family could play and enjoy solving the mysteries, especially if CBS came out with a low cost series of additional mysteries of varying difficulty.

THE PHILISTINE PLOY

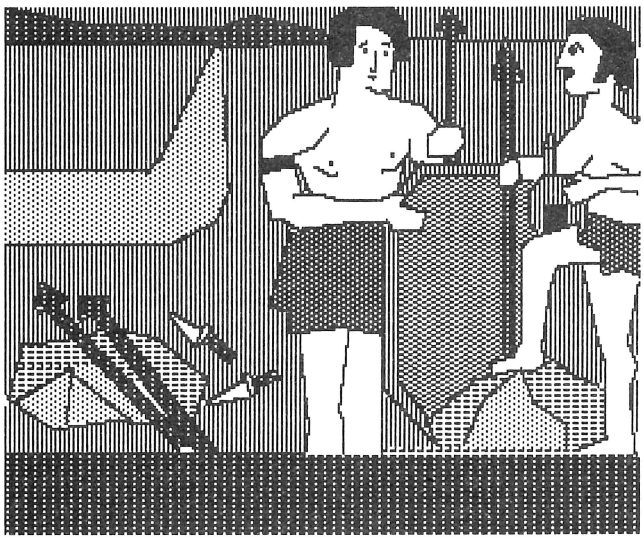
Davka Corporation
$34.95
48K; Apple II+/IIe/IIc

Overall Rating	C	Easy	*Challenge*
Creativity	A	D	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	A	26	*Save/Restore*

This two-sided Hi-Res adventure is set in biblical times. Your task: find the treasure of seven nations. You keep the treasure if you can successfully navigate the four separate sections and the eighty-three locations of the game. Numerous areas prove to be traps when you attempt to leave, and in two areas a rather mean Philistine warrior is looking for blood—yours. Unless and until you're properly equipped, you'd better keep your distance.

The biblical names in the text call up pleasant memories of Sunday School bible study, but you need no knowledge of the Bible to win. The graphics are excellent and finely detailed. Mapping gets interesting because the map, while logical, is not always rectilinear. Unfortunately, the game falls a bit short in some areas of implementation. The parser demands two words and the vocabulary is very weak. You can't even "look" at anything. The boot cycle takes quite some time and you must endure it each time you save a game.

You can only recall a saved game during the startup phase. You can make a total of twenty-six saved games to a scratch disk.



The long boot really gets to be a pain as you approach the conclusion, where you find yourself in a maze and only get one guess as to which way to go. If you guess right, fine, you get another shot; if you guess wrong, you're caught and clobbered, at which time you sit through another boot cycle. All in all, however, this series has promise if Davka makes a few changes in booting and vocabulary.

PIRATE ADVENTURE SAGA #2

Adventure International
$39.95
48K

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Vocabulary*
Documentation	B	C	*Value for Money*
Graphics	B	4	*Save/Restore*

Pirate Adventure Saga #2 is Adventure International's re-release of their second adventure. As is the case with *Adventureland Saga #1* (see review), *Saga #2* has been dressed up with Hi-Res graphics, and much improved documentation, with a separate Hint Sheet thrown in as well. In general, the commentary for *Saga #1* is equally applicable to *Pirate Adventure*.

The game itself is identical in all respects to the play of the original all-text version. There are two treasures to locate and collect, but getting them isn't quite as easy as it may seem. In conjunction with the hint sheet, and since *Pirate Adventure* isn't one of Adam's more difficult puzzles, it is especially recommended for beginning adventurers and young children whose parents are willing to "lose" them for several days.

QUEEN OF PHOBOS

Phoenix Software
$34.95
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	A-	Medium	*Challenge*
Creativity	B	C+	*Vocabulary*
Documentation	C	B+	*Value for Money*
Graphics	A	1	*Save/Restore*

In this black and white Hi-Res adventure game you board a long abandoned Martian spaceship to retrieve the legendary golden mask of Kuh-Thu-Lu. You must find the mask and escape with it before one of the four looters (who destroy your spaceship when they board) can ambush you. If you're clever enough, you can (and should) get them before they get you.

Enough interactive puzzles exist to maintain your interest; they are amenable to a logical solution except that you must guess which of the many weapons will work on each of the looters. The disk interactive graphics are drawn very rapidly; you toggle them off by pressing Return and entering an all-text, split-screen mode. This mode is nearly instantaneous and I highly recommend it if any nut (like me) wants to map out the one hundred plus stateroom maze, which you must traverse. Properly mapping the game may interest you as much as solving it. North always lies in the center of the ship, which is round. However, if you don't want to map, you can look for and find a map through the maze.

While you always find several key objects in fixed locations, the majority of objects appear randomly in each game, generally in the thirty-nine room periphery and never in the maze. Should the randomizer place a key object in the ship's five room central area, the game can become quite involved. To avoid this problem, you might consider making several new game starts to develop a map of the periphery and a list of the randomly placed objects. Until then, you have little need for the save game feature, which saves one game to a scratch disk. It saves and restores a game unusually quickly. The adequate vocabulary offers clear responses to unknown words.

Queen of Phobos continues Phoenix Software's tradition of fast action, nicely paced adventures. They accurately rated it as average in difficulty. However, it possesses above average quality and implementation.

Beginners will find the logic easy to follow, while experienced adventurers will spend an enjoyable day solving the puzzles and drawing the complete map.

THE QUEST

Penguin Software
$19.95
48K; Apple II/II+/IIe/IIc

Overall Rating	D	Easy	*Challenge*
Creativity	C	D-	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	C	∞	*Save/Restore*

The Quest is a two-sided Hi-Res color adventure of immense proportions but little content. You are the King's Advisor and have been given the task of ridding the Kingdom of a rampaging dragon. Gorn, the King's loyal but slow-witted champion, is your companion on this mission which will have you in blazing deserts, dark tunnels, and near endless plains, totaling some 250 locations. Later on, Lisa will join you if you find her, but never to be seen again (unless you end up in the dungeon).

The simplistic puzzles are few and far between, averaging perhaps one minor puzzle every 40 locations. Two puzzles present some difficulty: one because it's a red herring, and the other because of the specific syntax requirement. (You can't cover, wrap, protect or shield an object with the Oilskin, but you can "put" something in it). In the balance of locations you visit, there is nothing that can be done except look at the rather bland and often repetitive graphics. Mapping is necessary only because of the game's size, but all save two near-adjacent locations (perhaps a programming oversight) are totally predictable and rectilinear in nature.

The text is also generally flat and bland, but there are a few scenes in which both the text and the graphics have their moments, including a degree of animation. The vocabulary is terrible, and while the multiple word parser does accept more than two words, it acts only on key verbs, totally ignoring modifiers. Any number of games, named by the user, may be saved to a scratch disk. The game does not support two drives, and considering that a scratch disk and two frequently-flipped disk sides are involved, this constitutes a messy series of disk swapping.

If the Value Ratio were based on rooms for the buck, *The Quest* would be a real winner. However, despite its low price, the shortcomings are such as to leave a lot to be desired.

THE SANDS OF EGYPT

Datasoft
$29.95
48K; II+/IIe

Overall Rating	C	Easy	*Challenge*
Creativity	C	C	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	B	9	*Save/Restore*

The Sands of Egypt, a Hi-Res adventure game, features some nicely animated graphics, miles of sand, and a distinct shortage of water (at least initially). As a world famous archeologist, you are lost in the desert, near what you believe to be a hidden burial chamber. Thirst be damned: you have a reputation to uphold. It's on to the hoped-for treasure.

The friendly Help command nearly gives away the puzzles, a nice touch that prevents a lot of frustration. Some of the puzzles are obvious, but others are well hidden. The Help clues refer to the latter, but the graphics and text only suggest. The major difficulty is in the mapping, a necessary step to sort out all the sand. Once you learn your way around, you can play with your eyes closed. The desert seems to stretch on forever, but really consists of a relatively simple maze. You encounter only thirteen distinct desert locations among the twenty-nine of the game, but try to tell that to someone who just booted into the middle of the Sahara.

You can save nine game scenarios to the protected disk, then load them quickly and easily at any time. Kids will enjoy the puzzles, but may need some help with the mapping. Seasoned adventurers will be challenged for a few hours.

SECRET MISSION

Adventure International
$39.95
32K; II/II+/IIe

Overall Rating	C	Medium	*Challenge*
Creativity	B	B	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	B	∞	*Save/Restore*

Once upon a time, there was an all-text game from Adventure International called *Mission Impossible* that sold first for $19.95, and then (with two other games) for $39.95. Now, that same game, renamed *Secret Mission* has been dressed up with graphics, upper- and lowercase capability, printer output or Votrax capability, and repriced to $39.95. Refer to the description of the Scott Adams' Adventure Series for details, as the game is identical in puzzles, locations, and solution.

The significant addition is the graphics, which are pleasant enough but rather limited in scope due to the relatively small size of the game. The display format is the same used in the *Curse of Crowley Manor*, and may bother a few players as it switches from graphics to text display as soon as a key is pushed, and then back to graphics on hitting Return. The objects are in shape table form, and take forever to get up onscreen. This delay detracts from the flow of the game, especially when compared to the near instantaneous response of the Assembly language game itself; the command Z permits the game to be played in the all-text mode. At least the graphics do not materially detract from the imagination required to solve the game, as they do for many other all-text adventure game conversions.

SERPENT'S STAR

Broderbund Software
$39.95
48K

Overall Rating	C	Hard	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	C+	C	*Value for Money*
Graphics	B	1	*Save/Restore*

Serpent's Star is the second animated Hi-Res adventure game from Ultrasoft. It borrows heavily from the concepts developed for *The Mask of the Sun*, the game in which Mac Steele, your alter ego, was first introduced. The setting is Tibet, and your mission is to find the last three scrolls which lead to the fabled Serpent's Star gem and steal it. To accomplish this dastardly deed, you must visit two monasteries, buy and give away objects, initiate a few quick actions, dodge through an avalanche, answer a series of questions, map and navigate the maze, and even solve a puzzle or two.

The graphics on this two-sided disk are sometimes blandly repetitive; there are, however, a few excellent screens and sequences. Except for the "traveling screens" shown between locations where actions are possible, there are some 65 locations which can be mapped. There is less emphasis than before on animation; nevertheless, several animated sequences are superbly done, notably the resurrection of the Kara-Koram Monastery. Fortunately, two command keys now permit the sound to be cut off and the transit time between screens to be speeded up by about 10 seconds. The average time spent bouncing between screens is still a lengthy 15 seconds in the fast mode. A major improvement over *The Mask of the Sun* is the save-game feature, which now supports a second drive, one scenario to a disk.

The puzzles are generally part of a series; either you solve them or get stuck where you are. Most of them are obvious, but a few are difficult because they require the word "Search" of the right object, which may prove frustrating to all but seasoned and determined adventurers. Unfortunately, *Serpent's Star* is "riddle-happy." Three of the five riddles are more of a test on basic Buddhist and Yogi tenets, and you only get one chance to correctly answer each question. If you don't, by the Yin and Yang of Dragon and Man, you restart the stored game you quickly learn to make.

The text of the scrolls is interesting and maintains a good plot, although they don't have any significant bearing on the game's solution, nor do they contain any real clues. For that matter, there are no clues to the tougher puzzles or questions, making *Serpent's Star* an uneven adventure game that many may start but few will complete before giving up in frustration.

SHERWOOD FOREST

Phoenix Software
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Easy	*Challenge*
Creativity	C+	C-	*Vocabulary*
Documentation	C	B	*Value for Money*
Graphics	B+	10	*Save/Restore*

Sherwood Forest is a Hi-Res fantasy adventure game aimed at the beginning to intermediate adventurer. It's Robin Hood's wedding day, but several puzzles lie between the wedding and your shooting off to the Honeymoon Suite with the fair Maid Marion. Plot line and text displays aren't the long suits of this game, but it is one of the more professionally implemented to come along for some time.

The Hi-Res graphics are average in artistic detail, but unusually colorful, with nice touches of eye-blinking animation. The most significant touch is the almost instanteous scene switching and color fill time. These are almost as fast as the screen change of a text adventure, a mode also available in Sherwood. The command parser supports multiple words, but use of two words will easily handle all puzzles, so don't try to be too fancy. The save game implementation is excellent: up to ten scenarios may be quickly saved or called in from a scratch disk, but best of all, it provides a two-drive option. The only problem I encountered was in coming up with the word "insert" over "get," "put," "place," "set," or "drop."

Sherwood Forest moves quickly on several paths through its compact, thirty-eight location, mazeless

map. The puzzles aren't too tough, but are cleverly interactive and have several amusing twists. The authors have humorously anticipated some "wrong" answers. It will be necessary to crisscross from one side of the map to the other several times to unravel the sequence of puzzles.

Phoenix's rating of three, as being of average difficulty, is slightly overrated. The game is excellent for the beginning adventurer and youngsters, and yet is clever enough to maintain the interest of more advanced adventure aficionados.

THE SORCERER OF CLAYMORGUE CASTLE

Adventure International
$29.95
48K; II/II+/IIe/IIc

Overall Rating	D	Hard	*Challenge*
Documentation	D	D	*Creativity*
Value for Money	C-	D	*Vocabulary*
Graphics	C-	4	*Save/Restore*

Thirteen Stars of Power are hidden in and around the enchanted Claymorgue Castle, and you, Beanwich the Apprentice, must find them and store them away. That is what the sketchy documentation of this two-sided, hi-res adventure game says. Once inside the game, however, you'll find no story line, no characters to encounter, and no mention of Beanwich, just a bunch of stars lying around without any indication of their power or use. You need to gather them all and store them in a specific location.

The problems are very tough, even given the fact that you are in an enchanted castle where anything is possible. You have several spells at your disposal, but can only cast each spell once. Some spells can be used effectively in more than one place; so finding their correct use is difficult. Also, the game demands that things be done in a very precise order; so what is the order? The two-word parser is unyielding. Get ready to see a lot of "You see nothing special," and "That has no effect." Even for a Scott Adams adventure the vocabulary is terrible. There is very little text, no humor, and no clues. Also, the graphics of the twenty-nine locations leave much to be desired.

A Help command is available, but it offers no real help for any of the tough puzzles. A clue at the outset gets you started, but using it immediately throws you into a no-win situation, which is sort of dirty pool. A total of four save-game positions are available and may be made at any time. To recall a saved game you must quit the current game.

Although labeled as the thirteenth of the Scott Adams adventures, *The Sorcerer of Claymorgue Castle* does not live up to its heritage. There is little originality, and nothing to hold it together. It's a pity, because it does offer a real challenge.

STANDING STONES

Electronic Arts
$19.95
48K

Overall Rating	C-	Hard	*Challenge*
Creativity	D	C	*Vocabulary*
Documentation	C-	C-	*Value for Money*
Graphics	C-	∞	*Save/Restore*

This two-sided Hi-Res fantasy game could just as well have been called *Son of Wizardry*, copyright laws permitting. "Roll the dice" as many times as you wish to define the five attributes of your hero, then enter the first level of a fifteen-level dungeon in which you will encounter randomly-located piles of gold, shape-table created monsters, a helpful Elf, and an Oasis featuring arcade game diversions. Stick with it long enough and ultimately you'll find the object of your quest—the Grail.

An internal Help screen lists your commands, but it helps to write them down. You get both magical and clerical spells, with potions thrown in for good measure. The spells break down further into combat and non-combat types. The documentation describes none of them, leaving it to you to determine their most effective applications. If possible, try to play this game before you buy it, as several copies have trouble booting on different machines. Apparently the protection system demands a finely-tuned drive.

Standing Stones is a mapmaker's delight—the best I can say of it. Each level consists of a sixteen by sixteen location maze of corridors which you must painfully map to find either the exit to the next level or the return to the starting castle. Much of the pain in mapping comes from having no indication as to the direction in which you're headed nor any means of learning your absolute location. Because of this, many players will throw in the sponge before even arriving at the Oasis. At least you can save the game in the middle of a level, although it does require leaving the game temporarily.

TRACER SANCTION

Activision, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Creativity	C	C+	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	A	10	*Save/Restore*

Tracer Sanction is a humorous, two-sided, hi-res adventure game in which you must find a man called Wing and return him to his planet. You travel among eight planets, finding the darndest things in the darndest places. Eventually you'll find your way to the maze, where you'll locate Wing. You must take him to the planet marked on the chart with a question mark (?). Once there, you must learn the planet's real name. Aside from finding and returning Wing, part of the game's challenge is to figure out the correct sequence for visiting the planets. One strong clue is the amount of money that you find on each planet, which is controlled by the game. Since you must convert money into fuel for your spaceship, a logical sequence based on the amounts you find is not too difficult to determine.

The puzzles are relatively straightforward and not too difficult, but a few are a bit on the tricky side. Typing "Help" reveals the presence of a friendly Condor who will give you an obvious clue to whichever puzzle has you stymied.

The graphics are excellent, well-detailed, and colorful. The screen-fill speed is exceptionally fast. You can save ten games to the game disk. The disk also has "Quicksave" and "Quickload" features which save and reload your last position. It is one of the fastest save/restore operations I've ever encountered.

Tracer Sanction plays quickly. It is a pleasant diversion for an experienced adventurer, and would make a good beginner's game. The on-disk tutorial tells how to play an adventure, and is accompanied by several screens from a companion adventure, *Mind Shadow*. Both games are worth playing.

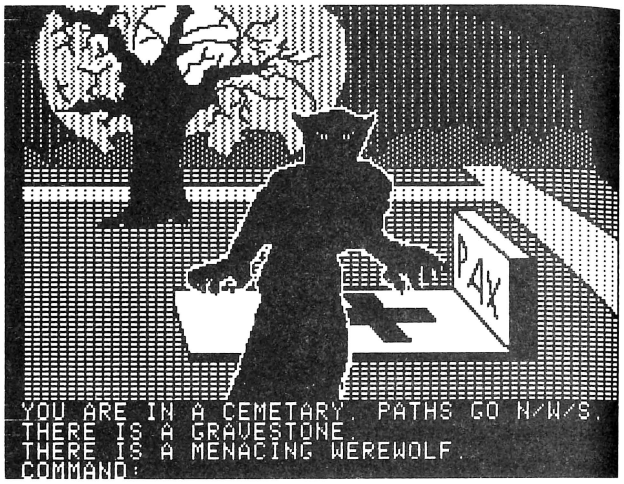
TRANSYLVANIA

Penguin Software
$19.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	C+	C	*Vocabulary*
Documentation	C	A	*Value for Money*
Graphics	A	∞	*Save/Restore*

Transylvania is a Hi-Res fantasy adventure with unusually good graphics. The mission is to rescue the Princess Sabrina, which means finding her, breaking the spell she is under, and returning her to the King. These tasks must be accomplished before dawn, five hours away, or she dies in a pool of blood.

The games is relatively small, consisting of thirty-six well-drawn locations. Don't dally about too long at the outset, as the Werewolf, a forbidding figure indeed, soon comes around. Next, you must deal with the formally dressed, finely detailed Vampire. After coping successfully with him and a series of puzzles, you will resurrect Sabrina, who significantly resembles a dark haired Dolly Parton. Sadly enough, the overjoyed King doesn't see fit to give you her hand in the end.



The puzzles are moderately interactive, not too difficult, and for the most part each provides an obvious clue to the next puzzle. Because of size, mapping isn't really required, although a degree of criss-crossing the locations is necessary. At the outset, there seems to be enough objects to create an inventory management problem, but most of them are expended when they are correctly applied, are needed only once, or are simply red-herrings.

Indeed, once you know the answers needed to find two objects in particular, most of the puzzles can be bypassed if you didn't make use of the save game feature, which produces a standard text file you must name before writing it to a scratch disk. A minor problem is that you can only call in a saved position at the boot cycle. The game permits a text-type version to be played by hitting a carriage return, but it doesn't speed the "Applesoft slow" disk interactive process.

Transylvania has no gimmicks, mazes, animation, or anything fancy, but it is a well-balanced, tongue-in-cheek (but not very funny) game with a lot of "rustling noises," howling wolves, cackling witches, and fluttering bats for atmosphere. It offers a few good hours for the adventure player; it's not too hard for the beginner and interesting enough for the more advanced player.

ULYSSES

Sierra On-Line Systems
$32.95
48K

Overall Rating	B	Hard	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	A	15	*Save/Restore*

Ulysses is a Hi-Res adventure game that rivals *The Wizard and the Princess* in overall concept. Your mission is to find and return the Golden Fleece to the King, thereby gaining a kingdom of your own, plus 300 bags of gold and the designation, "Level 2 Adventurer." This mission is frought with dangers and obstacles (i.e. tough puzzles) before riding home on Pegasus, surfeited with riches.

Ulysses is a better-conceived game than its immediate predecessors; it is also much harder to solve, in part due to a disturbing lack of recognition of many words, synonymous with text patterns which the computer will accept. The game also suffers from several bugs and logical shortcomings (i.e. range errors, fireproof wine, inconsistency when reentering rooms where an event or puzzle has previously occurred). The most flagrant anomaly is the carry-over problem from *Cranston Manor*: the lengthy powerdown and reboot process required after being killed off. The fifteen save-game capability on a scratch disk is great; scenarios may be made or called in at any time as long as you are alive; just don't get killed! (Hint: Save the game upon first encountering a major puzzle or obstacle, then restore the saved version at the position after three or four unsuccessful attempts to solve that puzzle; also, don't bypass the Isle of the Sirens, even though it is possible to do so).

There are almost 150 locations to be mapped, including many near-mazes in jungles, oceans, and forests. The majority of these are cleverly constructed to lead you to the next "correct" location. *Ulysses* is long and difficult, but generally maintains one's interest, provided one doesn't get disgusted with the rebooting equipment and a limited vocabulary.

WILDERNESS

Electronic Arts
$50.00
64K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Documentation	A	A	*Creativity*
Value for Money	B+	B	*Vocabulary*
Graphics	A	1	*Save/Restore*

There's a big difference between adventure games and simulations. Adventure games seem "safe" because you're roaming an imaginary world, solving hypothetical puzzles, finding glorious treasure, and are able to save your adventure to disk just before the evil creature dispatches you. Simulations, on the other hand, are more realistic, drawing their adventure from statistics and facts. They lack the mysterious atmosphere of an adventure. *Wilderness* combines the two in a game that requires common sense, knowledge of survival techniques, and an adventurous spirit.

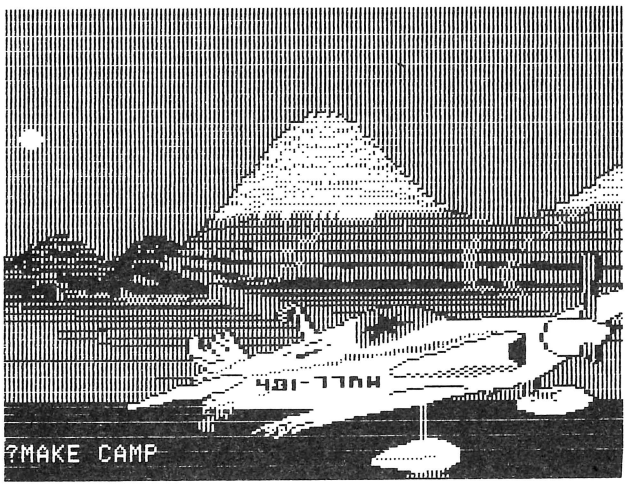
Your plane has crashed in the rugged Sierra Nevada mountains and you have to reach a distant ranger station marked on your map before you die. You're alone, lost, and the amount of food and supplies you can carry in your backpack is limited. In this contest between you and the elements, your life depends on your survival skills.

You have to ration your supplies, find nourishment and water, keep warm, and learn to navigate as you climb over hilly and mountainous terrain. Imagine, if you will, a computerized version of "Outward Bound."

The player enters two word commands. The terrain graphics are computer-generated from topographical maps and their content is based on your position. The remarkable graphics system, called Panagraphics, was developed by Dr. Wesley Huntress of JPL. As you move, it allows you to scan the landscape 360 degrees. After a time, it is possible to corrolate the surrounding mountains to those on the supplied map (an overhead map showing altitude contour lines, rivers, lakes, forest, and ranger station). While your location isn't shown on the map in the survival game, it is shown in the research mode, or when playing the Lost Cities game (included).

Although you usually have to pack your backpack with items from the plane, the First Journey option equips you with what you will need. As long as your pack weight doesn't exceed your body weight, you can change items or add extra goodies. Besides food, water, and warm clothing, important items are a compass, tent, fishing gear, knife, rope, altimeter, sunglasses, snakebite kit, insect repellent, matches, and fuel. With some food you have to be careful of spoilage. Sometimes you'll wish you had lighter clothing and a raft, but you can't overpack.

Generally, you choose a direction by panning slowly until you like the terrain or you have a hunch that it's the right direction. Then type Walk or Climb and the number of hours. You can navigate by compass (if you packed one) or by the direction of the sun based on the time. The journey is often interrupted by messages like "You are in an area of leafy plants," or "A cougar blocks your path." You enter your reaction with two word commands like "Scare Cougar."



The status and inventory screens keep track of your journey and supplies. They give information like weather, altitude, and slope, health and reports hunger or thirst. You quench thirst by typing "Drink Water" and the number of ounces. You make camp and pitch your tent at the end of the day with "Make Camp." More complicated tasks sometimes require three or more commands. These are listed in the extensive manual.

Like any adventure, this game is a learning process. You discover ground water to refill your canteen, and you make traps to catch game (not that I ever did). You can swim across a river, although doing so will leave you cold and disoriented. Making a fire warms you up. Actually, you should read your compass sometime on your journey before you take the swim. Perhaps I was just lucky in my journey in that I encountered only rain and didn't run out of food during the first few days, because, to be honest, I was lost. The games are long, very long, and I played for several hours. I'm sure I would have succumbed to the elements long before I found the ranger station. There is a save game option for those who plan to play for the duration.

The manual is a combination instruction book/guide book. It borrows heavily from the United States Air Force Survival manual, but reading all 115 pages isn't necessary to play the game.

In all, *Wilderness* is a first class software package. Like all good adventure games, it forces you to think and consider the alternatives. If you don't have a color monitor a lot of the natural features are lost. When you get tired of the two games on the disk, you can generate your own random terrain disk, or buy additional data disks for crash sites like Papua New Guinea, Burma, or other forbidding places for just $19.95.

THE WIZARD AND THE PRINCESS

Sierra On-Line Systems
$29.95
48K

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Vocabulary*
Documentation	C	A	*Value for Money*
Graphics	A	15	*Save/Restore*

The Wizard and the Princess may well set a standard by which future adventure games will be judged. This game is much more involved, longer and complete than was On-Line Systems' initial Hi-Res adventure game, *Mystery House*.

As an adventure game, the puzzles are much less involved and devious than are the Scott Adam's text games. There are several extremely difficult and illogical hurdles which must be overcome, such as at the very beginning which requires the crossing of several chasms. The Hi-Res graphics are excellent and, with the exception of the initial maze, are easily mapped. Color is effectively used, with various stylistical and well-designed shapes for the nearly one hundred different primary pictures (not counting variations due to object presence).

The object is to find and return a Princess, who has been bewitched by a wicked wizard and spirited away to his remote castle. It's tough just to get started. One must bypass a coiled snake; and most rocks that you might conceivably use to kill it are loaded with scorpions. After that, other formidable obstacles must be conquered: a desert, a wide canyon, a wooded beach area, two tropical islands, a rickety bridge, a thieving gnome, a pirate, a giant, a wandering merchant, and a labyrinthean and magical castle. Along the way, various objects will be encountered; some useful, some not, and some possessed with strange powers.

The game is straightforward and easy to play. Up to fifteen different positions may be saved on a scratch disk. Considering the unforgiving and dangerous nature of the terrain and its inhabitants, a frequent "save-game" command is highly recommended in order to catch your breath and regenerate your derring-do.

Both kids and adults will find *The Wizard and the Princess* to be a very entertaining and somewhat chal-

lenging game that will take some doing to successfully conquer. This adventurous rouser may cause some ego-bruising in a familial atmosphere, however, as the game-hardened precocity of youth will probably be the first to solve the problem of getting around the snake.

ZIGGURAT

Screenplay
$29.95
48K

Overall Rating	C-	Medium	*Challenge*
Creativity	D	C	*Vocabulary*
Documentation	C+	C	*Value for Money*
Graphics	C	1	*Save/Restore*

Ziggurat makes the fourth Hi-Res dungeon trek in the *Warriors of Ras* series. In many regards it resembles *Kaiv*. The dungeon graphics consist of the same small shape tables, but the blocks of granite look more sharply defined. Also, encounters take place in a second display, where each of the attacking monsters appears separately. Each game offers a different randomly-generated floor map.

The documentation is a bit better than before. At least this time you get a list of the functions of the many potions, rings, and wands that you may obtain. An internal (H)elp command specifies a few extra commands of unclear purpose. The documentation says that your quest is to find the Sapient Scepter of Sirocco, but my game says that I need to find the Giant Ruby of Tarej. Unfortunately, I can't get beyond level 5 because that's where the game hangs up on the review copy.

The game is slow playing, with several seconds of waiting after each command before the cursor reappears. You can save five game scenarios and five characters to the disk and import characters from earlier games in the series. This helps immensely in improving your character's survival capability in the monster encounters. Again, it's wise to save your game frequently and stock up on Potions of Health. As in *Kaiv*, the onscreen mapping of various dungeon levels is sort of fun in a repetitive way, but the monster whomping gets to be a bit much. If you liked *Kaiv* or enjoy monster whomping, you'll like this one.

Role-Playing

ALI BABA AND THE FORTY THIEVES

Quality Software
$32.95
48K; color adapter

Overall Rating	B	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	A	B+	*Value for Money*
Graphics	A-	10	*Save/Restore*

Ali Baba and the Forty Thieves is a delightful role-playing fantasy game. The Sultan's daughter has been kidnapped by the ruthless band of thieves, and has been taken to the thieves' stronghold deep inside a treacherous mountain. You play the famous Ali Baba, and have been summoned to rescue the lovely princess.

You enter a world filled with exciting characters, each with his own strength and allotment of weapons and armor. Some of these are loyal to the sultan and will assist you in your quest, but there are many opponents who must be overcome. Ferocious tigers, ruthless bandits, magical swords, and a deadly dragon are among the more than one hundred creatures you will face. These have a reincarnation ratio which you can adjust.

The game is played by keyboard input. The graphics are refreshing. As you enter each room, the contents, including visible exits, are identified by a moving cursor. While this slows game play substantially, it does help you familiarize yourself with the symbols used throughout the game. Various runes contain messages, and when you touch one of these, the message is displayed in lettering that is reminiscent of ancient Arabic writing. The accompanying music is a delight to the ears—a few bars of Rimsky-Korsakov's *Scherazade* done in multi-part harmony.

There is a degree of puzzle content, but it's not really sufficient to classify *Ali Baba* as an adventure game per se. Hints, either obtuse or blunt, are found in Runes. These cause your disk to wake up when encountered; other than that, there is no disk interaction in the entire 60-plus room game. New Hi-Res displays are nearly instantaneous, but the unfortunate byproduct of this is a very slow response in the interminable sequence of combative encounters. These displays are only slightly offset by the humorous text accompanying the encounters. Even with the Monster Regeneration Factor (i.e., difficulty control) set to zero, there seems to be a near endless procession of assault-minded thieves and assorted monsters. Mitigating this, but again at the expense of longer delays before it is once more your turn, there is the ease of calling in a veritable army of allies, including yourself, or any favorites that may have just been killed off. This multi-character capability also simplifies the difficult task of mapping, made complex by the extensive use of one-way doors and teleporting locations. The game is divided into dungeons and outside areas. Gold can be discovered in chests throughout both sections.

You may encounter in your adventure two other captives, Abdulla and Morgiana. Free them, and they show their gratitude by aiding you in your quest. If you are very virtuous, a unicorn may come to your aid in fighting the monsters. Be very wary of moving statues and collapsing tunnels: things are not what they seem in many parts of the dungeon, so explore with caution.

A particularly novel and amusing feature is that the bad guys, all being played by the Apple, are not too particular whom they clobber and will gladly pile into other bad guys. It's fun (in a devilish sort of way) to start a fight and then sit back and watch your enemies go at it. This feature, together with the multi-character capability, make *Ali Baba* great fun. This unique Hi-Res adventure should be a part of every player's collection.

APVENTURE TO ATLANTIS

Synergistic Software
$39.95
48K; Apple II/II+/IIe

Overall Rating	A	Medium	*Challenge*
Creativity	A	C+	*Vocabulary*
Documentation	A	B+	*Value for Money*
Graphics	A	∞	*Save/Restore*

Apventure to Atlantis is a smoothly animated, High Resolution game, complete with nicely done sound effects that neatly blend elements of adventure, arcade, and fantasy games into a single package. The object is to find and destroy the island of Atlantis, hopefully escaping alive. The game strongly resembles Robert Clardy's earlier *Odyssey* and *Wilderness Campaign*, except that this has a variety of new and novel ideas.

There are four distinct phases to the game. During the first phase on the island of Lapour, the player encounters and fights various monsters. The outcome is determined by a combination of strength factors and dice rolls. Obtaining an additional army, destroyed in these battles, is as easy as returning to the castle. The player also randomly encounters wizards who can be enticed into joining your party by the offering of spells. Monsters are small and very hard to see on the island's Hi-Res map display. Play during this phase quickly becomes tedious.

Game control during the sea phase (the second phase) is by a combination of keyboard and paddles. The ornicopter's movement is difficult to control and requires learning to fly against varying wind currents, navigating over islands, and fighting off strong monsters with a number of paddle controlled weapons while your fuel dwindles. Play during this real time phase is hectic; and if you have chosen a fast reaction time, nearly impossible.

Phase three takes place in buildings on the islands. Although boring and repetitive, this phase allows you to refuel and gain the magical spells required to cope with the perils of Atlantis. The buildings have puzzles and traps in them to overcome. For example, there are three notes in each building that contain clues to magic words which will open secret doors to other rooms. There are also opposing warlocks and trogs to combat. Eventually a room will be found that will enable you to refuel your craft and leave the building. Spells needed on Atlantis can be obtained by using the magic "detect spell" on some of the treasures. All buildings contain the same rooms, furniture, and traps. They are simply put together randomly on each island.

If the player feels that he has acquired sufficient magical spells, then he should try to fly his ship to the island of Atlantis for the fourth and final phase. The scenario is played out on an island map containing a prominent volcano. Exploring the island is a game within itself as you map the maze-like terrain. As the island's maze guides you toward the Crack of Doom, you encounter many Hi-Res puzzle-type drawings. Solving these leads you to inaccessible portions of the island that you were unable to map, and one provides a clue to your escape route. There are many dead ends and hazards to prevent you from completing your quest. It will take all of your best spells to succeed.

Synergistic provides an excellent Hint Sheet with extensive documentation. However, it lacks a listing and description of valid commands in the various phases. Upon beginning each new phase, be sure to press "?" and study the command capabilities carefully, or you will never escape from an island. The stop-action "Suspend" command is always available and should be used to study a situation, as the real-time element of an attack poses a danger requiring a response speed proportional to the selected degree of difficulty (Arcade freaks will go for "9"; staid Adventurers should opt for "0").

The game is long, repetitive, and often frustrating; buildings on each island all have the same 21 rooms (rearranged on different islands), with the same traps to overcome. Use of a Magic Orb is a neat form of an internal save-game feature, especially if you lose a key wizard. A single scenario may be saved to the protected disk. A limited vocabulary is nicely overcome by using single keystrokes that produce all acceptable action verbs. One bad feature is that the game will not check for using the same name twice; but the capabilities of the second name then are "locked" out by the first. Also, at the Crack of Doom, be sure to DROP, rather than USE the Orb!

The puzzles are not at all difficult, being of the trial and error type (a la *Odyssey*). The mapping of maze-like *Atlantis* is an exception, however, and is a fun challenge. The game will be especially enjoyed by fans of Clardy's earlier games, and is noteworthy for its excellent documentation and several new gaming concepts, innovative command structure, and the Hi-Res display of *Atlantis* that "colors" itself in as it is successfully explored.

BENEATH APPLE MANOR—SPECIAL EDITION

Quality Software
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	Easy	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	A	B+	*Value for Money*
Graphics	A	∞	*Save/Restore*

Beneath Apple Manor is a neat update to the original, and now features colorful Hi-Res graphics. When released in 1978, it was one of the first fantasy adventures for the Apple; and has since become a classic, even though there are no puzzles or a true mystery to the game.

The concept of *Beneath Apple Manor* is simple: find the Golden Apple, hidden deep in a multi-level cavern. The monsters encountered become more powerful in the lower levels, but by then you've searched out the magical items and gained the experience that you need to cope with them. Applers not familiar with *Beneath Apple Manor* may be disappointed in this simplicity, but it is just this quality that gives *Beneath Apple Manor* its strength, staying power, and variety of approach strategems.

The full range of original options is still available—up to ten rooms, and a one-to-ten level of difficulty. In the "standard" game of five rooms or less, the new shape-table Hi-Res graphics add an interesting new dimension. The familiar Lo-Res display of the original can be used for any number of room configurations, and must be used for six to ten room games due to screen size limitations. *Beneath Apple Manor* devotees will be pleased that the new assembly language version is lightning fast in its response, has switchable sound effects, and embodies a save-game feature which permits a game to be saved to a scratch disk each time you buy a "scan."

The Special Edition also has three new magical items and two new types of monsters, a fairly easy to handle Invisible Stalker and a Vampire that is nearly as difficult to handle as the Dragon. Even without these additions, owners of the original *Beneath Apple Manor* will find the improvements in the game worth the price. Those who have never played *Beneath Apple Manor* before will find it to be undemanding of fast reflexes or a lot of thought—it is escapism, pure and simple, and an untiring form of fun.

BEYOND CASTLE WOLFENSTEIN

Muse Software
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B	A	*Value for Money*

Successful games usually have sequels and *Castle Wolfenstein*, the ever popular arcade adventure game, is no exception. This time, you must assassinate Adolf Hitler while he attends a conference down on the third level of his underground bunker. The underground resistance has hidden a bomb in a closet somewhere inside. You must find the bomb and plant it inside the conference room without being detected by any of the numerous guards that patrol the corridors of the maze-like building.

You begin the game with a gun, ten bullets, one hundred Deutschemarks, and several passes that allow you to move from one floor to another. Guards in each room will ask you to come to them (in German) and show your pass. If you show the wrong pass, the guard draws his gun and asks again. You can try another pass (you need a different one for each floor) or offer a bribe before he starts shooting. Of course, you could shoot the guard before he draws his gun, or stab him in the back with a dagger found in one of the closets. If you do, you'd better search him for a good pass and more ammunition. You should also drag him out of the main hallways so that another guard doesn't see the body and trip the alarm. The guards in this sequel are much more alert; if you shoot one of two guards in a room, the other will sound the alarm. The desk-bound guards aren't dangerous, but you can sometimes bribe them for cryptic clues.

Most rooms contain a closet, generally locked with a combination lock. You must press the number keys until you hear the tumbler click, alert to the sentries marching nearby. If you guess wrong the second time, you must start the three-digit combination over. Closets sometimes contain useful items, like a dagger, tool kit, or first aid kit (necessary if you are wounded). You'll also find the bomb in one of these closets. Several of them actually conceal secret passages to another floor.

Usually you take an elevator to another floor. However, your pass is no longer valid and you may have to kill another guard for his pass. Once you find the bomb and set the timer, you must locate the conference room and plant the bomb. You might get a little nervous with the timer ticking toward zero, but you can reset it if necessary.

You control the game with all keyboard commands or with a combination of joystick or paddle movement

and keyboard commands (to fire). I found paddles impossible to deal with and joysticks not a whole lot better. Keyboard control demands eight commands plus the number keys. While I personally have trouble handling strictly keyboard control, you might prefer it after practicing for an hour or so.

Like its predecessor, this game has black and white line drawings for graphics. The sound effects are adequate and the barked German commands understandable. You can choose from five difficulty levels and begin with the same bunker or generate a new one each time. You can save long games automatically by hitting the Escape key.

Beyond Castle Wolfenstein is thoroughly enjoyable and somewhat addictive, with a realistic plot based upon history. I found it more interesting than *Castle Wolfenstein* and I felt more in control. Beginners may find the game somewhat frustrating while learning the controls, but they will enjoy it. Even players on the "resistance fighter" level will find this game a challenge.

CASTLE WOLFENSTEIN

Muse Software
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Creativity	A-	B+	*Graphics*
Documentation	B-	B+	*Value for Money*

Castle Wolfenstein is the first game to combine an adventure scenario with a real-time, arcade-type game. The Germans are holding you prisoner in the dungeons of Castle Wolfenstein. A dying cellmate gives you a gun and ten bullets. The object is to find the war plans for Operation Rheingold and escape from the castle.

As one wanders from room to room, one encounters various chests, patrolling guards, and sometimes SS stormtroopers. Some of the chests contain items you need: a German uniform, a bulletproof vest, and, at times, even ammunition. The chests require time to open. You can replenish your supplies by searching the dead guards.

Your protagonist is controlled by either keyboard, paddles or joystick. The joystick provides the best control method. Your player can be directed with ease with the joystick and, if it is self-centering, your player will stop when the joystick is released. When button #0 is pressed, the joystick aims the gun. Button #1 is used for firing. Keyboard control is similar; however, it uses two groups of nine keys. The center key of the block of movement keys stops motion. The problem with the keyboard control method is that you must make sure your fingers are always in the right position. If you don't press the stop key quickly, you will crash into walls. Paddle control is simply a disaster. Apparently, Muse has calibrated their game to work with a particular paddle. You're supposed to be able to judge the direction of movement by marking the paddle. With both the TG and Apple paddles, it doesn't work. Turning them very slightly shifts the movement from straight-up to diagonal-right. Consequently, one is always going the wrong way; this is frustrating in a real-time game.

The game is quite good and fun to play. There is some sound implementation for the guards' voices—German vocabulary, of course. There is variety in this game, too, although the castle layout will stay the same until you escape or you choose to generate a new and random castle before escaping. This gives you a chance to learn or map a particular game. If you win and advance in rank, the difficulty factor increases.

CRUSH, CRUMBLE AND CHOMP

EPYX
$27.00
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	A	B	*Value for Money*
Graphics	B	∞	*Save/Restore*

In *Crush, Crumble and Chomp* you can play one of six featured monsters (or one of your own home-grown creatures) to attack the city of your choice: San Francisco, Washington, D.C., New York City, or Tokyo Harbor. With your fiery breath you can burn entire cities or smash them underfoot. You can block roads with your webs and escape underground where tanks dare not tread. Your monster can tear apart bridges with its tentacles, emit an ultrasonic scream as you grab the populace and fly over a city of smoking ruin.

Of course, being a monster isn't easy. You're always hungry. A good rule is: if it moves, it's edible. And the city, played by your friendly computer, has an arsenal of police cars, tanks, artillery, helicopters, National Guard, and your indomitable mad scientist.

You control the monster with a variety of keyboard commands. All monsters have a basic command structure that controls general direction, head position, and movement. Some monsters can burrow, one can fly. All can crumble buildings or grab fleeing crowds. Each has its specialty, like (A)tomize or (U)ltrasonic Scream,

(B)reathe Fire, (W)eb (weave obstructing web), or (Z)ap flying units with ray gun. Control, at least if your monster hasn't gone berzerk with hunger and you're not sure if it is really paying attention, is rather sluggish. This is because you're taking turns with the computer and it's not ready for your next command. Be patient; it has to update the screen and attack before you can make a next move. Impatience, unfortunately, causes you to enter too many commands; consequently, one often overshoots a destination or misses a target.

One can monitor the game as you move around sections of the city on a Hi-Res map. Your monster's health, his hunger status, head position and general direction are all displayed on the right side of the screen. The head position is displayed in all its living facial horror. It keeps you aware of who or what you are.

Yes, this game is for real and it can actually be fun to play once you get used to the keyboard controls. It is certainly a way of releasing your aggressions and no different than those shoot-'em-up games where you play the good guy and kill the aliens.

I think the major disappointment lies in the graphics. The display map and animation are done with well constructed Apple shape tables, but the display update is slow and cumbersome. While some of the newer games have switched to raster shape tables and machine code to produce smooth, instantaneous Hi-Res scrolling on their maps, this game laboriously draws a new map once the monster gets off the edge of the screen. In a game that essentially runs in real time, this is somewhat distracting. The game does offer a lot of creativity, is challenging, and is well documented in a lengthy but humorous vein.

EAMON ADVENTURES

Computer Learning Center
$4.00 per disk
48K; II/II+/IIe/IIc

Overall Rating	B+	Medium	*Challenge*
Creativity	B	B	*Vocabulary*
Documentation	None	B+	*Value for Money*
Graphics	None	1	*Save/Restore*

Eamon Adventures is a collection of entertaining, flexible, fantasy role-playing adventures in the public domain. This means they aren't copy-protected or copyrighted, so you can make backup copies, alter or study the program code, etc. The series currently consists of over thirty-five various text adventures with no graphics except for the title page. All the adventures begin by creating your character with the Master Program Disk. You then insert the disk containing the adventure you want to tackle. Each adventure accepts similar commands as you move your character from location to location. A Help command calls up a reminder of the commands available. You can save adventures and continue them at a later time. Titles include *Beginner's Cave, The Devil's Tomb, Death Trap, The House of Ill Repute,* and *The Quest for the Holy Grail.* You can also obtain three tournament adventure disks and four utility disks. The utility disks allow you to modify, print, and understand the games, characters, etc. Whether you like playing adventures or want to write adventure programs yourself, at $4 per disk you just can't go wrong with the *Eamon Adventures.*

FRACAS

Quality Software
$24.95
32K

Overall Rating	C	Easy	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	B	B	*Value for Money*
Graphics	C	10	*Save/Restore*

Fracas is a light-hearted and fairly amusing medieval-days-of-combat and get-the-booty program with a few new twists. The diskette provides the identical game in both Integer and Applesoft versions. The game permits from one to eight players to independently move about and do battle with each other, as well as with the computer's own menagerie. Under some circumstances, these computer characters are perfectly happy trying to kill each other off, while you are free to watch or get their ducats and then take on the survivor. The use of sound has been effectively coupled to the seemingly unending and repetitious combats on a Lo-Res field of well-thought out and colorful displays. (It is not recommended for a B & W display.)

The game is simple to play and character generation is well prompted. Game commands are few and simple. There are no puzzles, mazes, or mental challenges. The game objective is in the mind of the player(s), and several interesting alternatives are suggested in the documentation. The multiple-player concept and extreme simplicity make *Fracas* a lot of fun for a group of small children, while the ease of creating a new player character or committing hari-kari make it a perfect party game for your non-computer friends. On the other hand, it won't cause them to run out and buy an Apple or provide you much reason to play "solitaire" against it more than once.

GALACTIC ADVENTURES

Strategic Simulations, Inc.
$59.95
48K; Apple II+/IIe/IIc

Overall Rating	A-	Hard	*Challenge*
Creativity	B+	B+	*Vocabulary*
Documentation	B-	A-	*Value for Money*
Graphics	A-	60	*Save/Restore*

Galactic Adventures combines a variety of game styles—role-playing, adventure, strategy, action, and others. It offers you multiple worlds to explore and many different creatures to battle. You strive to gain the title of Independent Adventurer. You can play alone or against another person. You can also create an adventure for another person.

You begin your adventure by creating a character. The computer keeps track of your attributes: strength, dexterity, endurance, speed, intelligence, and sensitivity. The species chosen determines the maximum and minimum for each. You can choose from among the seven known species. During the course of the adventure, you encounter these seven species plus eight others. You also get to determine the skills that your character possesses, classified broadly into object skills, people skills, and weapon skills. Some of the skills, like medical, require a device to practice. When you choose the weapon skills, you select the weapons used and the character's proficiency with each. Depending on the species you chose, you get one or more weapons; however, when you have more than one, your ability to use it falls. Obviously, you need a high percentage of accuracy using a weapon rather than the ability to use many of them.

Once you have created a character, you proceed to gain experience. Since you are alone, your first priority is to get companions. You can collect from one to ten people (or creatures) in your group by hiring or buying them, or cloning yourself. Then you train them. The way to do this is to survive encounters with hostile forces (at which point a second person can play). Once you have gathered a group, you can journey out among the stars in search of adventure. You enter the combat phase if your party is attacked or attacks another group. In fact, one of the game's strong points is the fast action of the fighting. You instruct each of your people what to do; the computer works out the results and gives you the entire battle in fast action. You see the shots, who's shooting, and how much damage each side has suffered. (An option lets a second player play against the other group.) After the enemy all lie dead or wounded (or have surrendered), you can rob them of weapons and money. You can always use more money, and can sell the weapons if you don't need them. When you use your weapon successfully and score a hit, your weapons skill has a percentage chance of increasing by one point, the percentage depending inversely on your current skill level. When you survive combat, your experience increases.

The instruction booklet helps you understand the point of the game, but barely touches on the commands, forcing you to experiment with methods of doing things. Once you have successfully completed an action, you can easily repeat it. Luckily, you can save the game and thus have the opportunity to try many different things. Really, the documentation is the weakest point. You just have to play the game and see what happens. Otherwise, this is one of the best games I have ever played, and I highly recommend it to anyone who likes long, exciting, and occasionally frustrating adventures.

IN SEARCH OF THE MOST AMAZING THING

Spinnaker Software
$39.95
48K

Overall Rating	B	Hard	*Challenge*
Creativity	A-	B	*Vocabulary*
Documentation	C-	B-	*Value for Money*
Graphics	C	1	*Save/Restore*

In Search of the Most Amazing Thing, a game designed for children, departs from the usual kill-the-aliens theme and, instead, encourages you to negotiate with the creatures. In order to succeed in finding "the most amazing thing," you must obtain clues from different alien cultures. You must discover how to interact with them: how to read sign language, exchange currency, read maps, and compose songs for which the aliens might wish to trade information.

The journey begins in Metallica, where old Uncle Smokie weaves tales about his past search and offers you the use of his B-Liner for the trip. The B-Liner is a combination hot-air balloon and dune buggy. It is even equipped with an oil-drilling platform on its rear deck so that fuel shortage is never a problem. However, the B-Liner is not fully equipped. You can auction items gathered from Smokie's previous trips to raise money to buy your equipment. The Metallicans, however, are a crafty bunch. If you ask too much, they will steal your item. It becomes a challenge to outfox the aliens at the auction. Since you need a lot of green chips to buy the necessary things, this portion of the game is extremely slow and repetitive. I've been told that some children

are completely absorbed by this section. I was bored, and I'm sure older children would be, too.

Once the B-Liner is fully equipped and you have enough clues from Uncle Smokie, you set out on your quest. You fly or drive around the Darksome Mire and get fuel by anchoring against a Night Rock and drilling for oil. To do the latter, you don a jetpack and fly outside to the rear platform. You drive and fly using the AWDX and S cluster of keys. You gather food by driving up to a Popberry Tree, flying to its branches, shaking a piece of fruit loose, and then scooping it up from the ground before it sinks into the tar.

Flying the balloon takes practice. Winds of various strengths and directions blow at different altitudes. You can only use one instrument at a time. If you are busy monitoring your radar, looking for the nearest hut, and you want to see if you are getting closer, you have to activate a direction display and then an altitude display. Each of these takes time to draw on the screen. By the time you figure out you are going in the wrong direction, the hut is gone. The game would have been much better if an entire instrument panel continually showed game information. It probably isn't that important, though, because you eventually drift near a hut somewhere in the Darksome Mire, and then you can drive the rest of the way to the hut.

This portion of the game is designed to make you think. First, you have to read the map to determine which land you are in. (The clues offered by the B-Liner's computer modules require the name of the culture.) The clues will give you information about the aliens, such as what the value of their currency is and what music they like. They will also tell you the aliens' sign language (to which the creatures point with their antennae) for six important phrases used in trading. Since music is very important in trading, you are equipped with a music composer. If you can deal successfully with the aliens without offending them or scaring them away, you can trade for a clue to find "the most amazing thing."

While this game is intriguing and educational, it takes innumerable hours to play. Fortunately, it does have a save-game feature. I wonder, however, whether the average child has the patience to play this game due to the time it takes (even days) to find "the most amazing thing." It certainly teaches the child to think, for the instructions only offer some basic clues. A short novel accompanies the package, thus giving the child some background. All in all, although it is too long and slow, *In Search of the Most Amazing Thing* is a good, interesting game for a child with a long attention span.

KAIV

Screenplay
$29.95
48K

Overall Rating	C-	Easy	*Challenge*
Creativity	D	B-	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	C	6	*Save/Restore*

This Hi-Res dungeon trek is second in the *Warriors of RAS* series. You take your novice character into a randomly generated underground cavern where the walls and shape of the cavern become apparent only as you move through it. Zillions of monsters lurk in these caves. To gain experience, you must get them before they get you. Along the way, you collect piles of gold, potions, and occasional rings and wands. About the sixth level you find a treasure chest containing a slug of gold. You amass as much treasure as possible and try to exit (alive) the same way that you came in. At the outset, it's tough to gain enough experience to survive—you get wiped out very quickly. Your best chance is to save the game after each successful encounter so that you can restore the old game after an unsuccessful encounter in which you lose valuable points. You can save either six scenarios of the game or just the character itself to the protected disk.

The graphics of the cave look small and delicate, while those of your character and the monsters are small shape tables. The encounters with monsters seem interminable. If you meet five zombies, for example, you must deal with them one at a bloody time. You do have the option of trying to run, hide, or bribe them, but they always get a free shot at you as a minimum. The game plays very slowly, especially for an Assembly language game. You must wait several seconds after each turn until no more messages appear and the cursor reappears. Only then can you enter your next move.

This game desperately needs a command card. The commands are buried in the documentation, which you must read carefully prior to starting play. I suggest that you boot up the game, type Help, and copy down the three pages of usable commands. Mapping of the multi-level cave is fun in a repetitive sort of way, but the monster-whomping is a bit much. If you're into this sort of thing, you may enjoy it, but there really is very little to this game.

KNIGHT OF DIAMONDS

Sir-Tech Software, Inc.
$34.95
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	Medium	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	A	A	*Value for Money*
Graphics	A	∞	*Save/Restore*

Knight of Diamonds is the second scenario in the already classic *Wizardry* series. This dungeon offers new puzzles, objects, monsters, and traps, and adds six challenging levels, requiring careful mapping and considerable patience to conquer. General operation of *Knight of Diamonds* is identical to the first scenario, *Proving Grounds of the Mad Overlord.*

The object is to find and return the Staff of Gnilda to the City of Llylgamyn (whoever said you have to be able to pronounce what you play?). There is much more to explore and learn than just recovering the staff, and careful and probed mapping is required to discover them; it may be easier to discover secret doors when it's "Very Dark," which simply says you've got something to kick about! To get started you must have developed characters from the *Proving Grounds* and then transfer them to the new scenario, using the Utilities on the Boot Side.

It is recommended that characters be at the 13th level or higher; the need for this will soon become painfully obvious. It is possible to encounter the "disaster" of having your entire party paralyzed and lost forever (i.e., back to square one on scenario one), although the unexplained "Disband" command appears helpful in avoiding this finality. Unfortunately, there is no documentation with *Diamonds,* and unless you have a late version of the *Proving Grounds*, the subtle differences can be bothersome. As with later versions of *Proving Grounds,* a Utility permits you to make a backup of the scenario side, to which you can then transfer your characters. Although this reviewer had two disk failures on *Proving Grounds,* the first scenario copy of *Diamonds* survived through the final awarding of the letters.

In the dungeon you will meet with the No-See-Ums before too long. Their number (four groups of up to nine in each group), may get your heart beating and take forever to end their turn, but then there is always "Tiltowait"! Much worse than these pests are some of the evil characters that love to take all but one hit point away from your favorite members. But what is really final is the setting off of a Teleporter and being transported into solid rock, of which there seems to be much more than in *Proving Grounds.*

Knight of Diamonds is the maze-type adventure at its best. As with the original *Proving Grounds*, it can be played with from one to six people (with one person acting as the Dungeon Master at the keyboard), and will provide many more interesting hours of game fantasy. The bottom line is that *Knight of Diamonds* is just like having levels 11 through 16 added to your initial *Wizardry* scenario disk.

LEGACY OF LLYLGAMYN

Sir-Tech Software, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	D	B+	*Value for Money*
Graphics	A	0	*Save/Restore*

Legacy of Llylgamyn is the third Hi-Res fantasy in the *Wizardry* series. Six more levels of underground mazes wait to befuddle even the most avid mapmaker. You need the Proving Grounds of the basic *Wizardry* disk or characters from the second scenario. Each new character must first undergo the Rite of Passage, a euphemism for setting all your hard earned hit points and spell capabilities back to square one. You'll also need the documentation from the original game unless you have memorized all the spells.

Generations have passed since the time of *Wizardry* and *Knight of Diamonds.* Peace has prevailed until recently, when strange occurrences have worsened to the point that a call has gone out to the descendants of the original adventurers who brought peace before. Your mission: to find the one remaining relic powerful enough to reveal the source of the danger, the mystical Orb hidden deep in a mountain lair and guarded by the dragon L'kbreth. Long before you reach her, however, you'll find it tough to survive even the first dungeon level with your entry-level characters. Be of stout heart—and keep running back to the Adventurer's Inn to build up your hit points.

The modified graphics display provides two modes. The first, similar to that in the original games, provides a display of the characters forming your party with a display in the upper third of the screen to indicate encounters and messages. The second provides a full screen display of the dungeon, adding to the three dimensional effect but not offering much more information than what you can see through the "periscope" effect of the first mode. The beginning of the game also provides several well drawn Hi-Res displays detailing the background to the game. You get more puzzles this time in the form of relatively simple riddles. Unfortu-

nately, you still cannot save the game in the midst of the dungeon; you must be in the Castle to save your characters. When you boot the game, some 80-column cards will switch into the 80-column mode, even with a softswitch, so prepare to plug in your normal video output manually.

Devotees of the original *Wizardry* will have a ball with the fresh graphics and the orgy of mapmaking that lies ahead of them in this game. The addition of the riddles add a slightly different flavor, but not to the point of making the game difficult. You will need to use two separate parties, one good and one evil in alignment, to get to the Orb. *Legacy of Llylgamyn* offers six more *Wizardry* levels, no more, no less. If you're not yet burned out on that game, this one is just what you've been waiting for.

NEW WORLD

EPYX
$29.95
48K

Overall Rating	C-	Medium	*Challenge*
Creativity	C-	N/A	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	C		

The year is 1495 and you find yourself the ruling monarch of a European power in search of colonies in the New World. No, you haven't been reincarnated, but are playing *New World* by EPYX. The object of the game is simple: establish colonies in the New World and bring back the most riches.

New World is a game for one, two, or three players comprising twenty-two turns, each representing five years' time. During each turn, a player collects taxes and income from his colonies, recruits colonists, and buys soldiers, supplies, and ships. When you arrive in the New World, you look for gold or fight Indians and other colonial powers.

A menu is presented with the choices available to you during your turn. In addition, you may look at a chart of either North or South America at almost any point during the game. These charts are a Hi-Res picture of the continent and allow you to check on colonies' statistics (like how many natives, soldiers, and colonists are there, whether gold is likely to be found, and how many movement points are required to reach the colony).

Choose to search for gold and you'll see colonists on the bottom of the screen with picks working to find that precious metal. Choose to launch an expedition and watch your ship sail across the bottom of the screen. Text screens present all other necessary information regarding your colonies and the state of affairs in Europe. You may stop in the middle of the game and save it to disk to play back later. No provision is made for saving high scores on the disk.

There are some minor inconveniences which detract from the overall enjoyment of the game. If you enter RETURN when the computer expects you to enter a number, the program sends you back to the very beginning, forcing you to start over.

When playing alone you cannot choose which country you want; you must be Spain while the computer is France. You are never shown what moves the computer makes. Only by going to the charts and checking on each of the colonies can you determine how the computer is doing.

Attrition and nature often take their toll on your colonies and a message is displayed to this effect. However, you never know exactly what the damage is until you examine the charts—a time-consuming process.

The idea for *New World* is a good one. Had it been around when I had World History in school, I might have paid more attention. However, the game is clumsy and slow in places and the bugs, although minor, detract from the play. Fix these problems and *New World* would be a first rate program for the school environment.

New World is copy protected, but EPYX will replace a defective disk within thirty days for free. After thirty days there is a $5.00 charge.

ODYSSEY

Synergistic Software
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	Easy	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	C	B+	*Value for Money*
Graphics	A	1	*Save/Restore*

Odyssey is an epic extension of its forerunner, *Wilderness Campaign,* also by Synergistic Software. As with *Wilderness*, the object is to overcome the bad guy in the castle by trekking through plains, swamps, mountains, and deserts, collecting men and material by negotiations with merchants and doing battle with sundry monsters. In *Wilderness* there was one outstanding Hi-Res multi-color display that held your attention for the duration of the game; *Odyssey* provides two such outstanding displays, a third that's almost as good, and a quasi-Hi-Res maze that smacks of *Dungeon Campaign.*

The initial *Odyssey* display is that of an island, where graphics are even enhanced over *Wilderness* by indi-

vidually small but collectively significant improvements. Similarly, other aspects of this phase are improved; better sounds, fewer total repetitious battles, a simplified and cleaner battle display. The documentation is jazzed up, and the program runs better from the standpoint of error trapping. Much remains the same, however; the game is pure escapism in all phases, no real thought is demanded, and the few puzzles are trivial. What is demanded is endurance, made enjoyable by the display quality and bearable by the Save Game command.

The second Hi-Res display is of your small ship in the big ocean. This phase is less polished than the first land phase, but has several neat "special effects" that are fun. It's a challenge to learn to sail your ship as the wind and current change frequently, but after you learn which of the other visible islands is your final port, the sea phase progresses more rapidly than the initial island actions. On all islands, save one, you can encounter a wizard guarding an old temple. You need to convince him to allow you to pass in order to venture into a Hi-Res maze of basements, again doing battle with or running from assorted monsters while in search of the magical Orb. These game phases are not as well error-trapped as the island phase, thereby allowing the ability to spend "negative" money and deal with fishermen whom the text lines told you sailed off several moves ago.

The final Hi-Res island is artistically done. It presents only five simplistic obstacles to overcome until "you reach your final objective." At this point, the game disappointingly ends with a simple text tabulation of your net worth, adversaries killed and general summary. After the time investment necessary to get to this point, it seems a shame to forego the snazzy type of ending available in *Wilderness Campaign*.

Overall, *Odyssey* is an improved and lengthened *Wilderness Campaign*, interesting by virtue of sight and sound, that can become tediously repetitive. Kids will love it, others may lose interest, but it's fun until that happens.

A last comment: there are still a couple of programming errors to watch out for, similar to those found in *Wilderness Campaign*.

QUESTRON

Strategic Simulations, Inc.
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C+	Hard	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	B+	10	*Save/Restore*

Questron, a fantasy adventure, so closely parallels the *Ultima* series that it's a wonder that Lord British hasn't sued for some kind of infringement. You start as a lowly serf in a country nearly dominated by monsters created by the evil wizard Mantor. The King and the good wizard Mesron are virtually captives in their castle. It falls to you to seek out and destroy Mantor. To do so requires a considerable amount of gold, obtained by a lot of dungeon trekking, monster whomping, and some luck at the gambling tables found in most of the villages that dot the countryside. If successful, you are promoted to Baron and the disk prepares your character to tackle an announced *Questron II*.

The graphics resemble those of *Ultima* and have an identical scrolling action. The principal difference lies in the method of controlling your character, done here by pressing the first letter of the command you wish to invoke. Available commands always appear on the left side of the screen and may change as a function of your location. As in most fantasy adventures, the puzzles are simple, with the key being to strengthen your character for the final onslaught after finding various objects such as keys, a trumpet, and a diamond ring.

Much of the action on the first of the two continents takes place in the castle, where you must find six keys—not an easy task as the guards don't take kindly to thieves. On the second continent, I advise you to stick to the sea because the land monsters are real toughies. The mission there involves three dungeons which you must plumb to their depths (eight levels in the first two and seventeen or so in the third). Mapping is difficult, especially in the dungeons, because the key action is slow and the game does not accept commands as quickly as you would wish. No magic ladders up or ladders down help you—ya gotta find the darn ladders or holes in the floors amid all the traps and hit-point eating critters, caskets full of hit points, cases full of gold, and urns filled with the darndest stuff.

The save-game capability is a bit better than that of *Ultima*; you may save a number of separate characters to the protected disk, but you may not back up a character or separate him from his location at the point that you saved the game. Thus, you really need but one character to save after achieving something of consequence. The documentation is adequate, but leaves a lot for you to discover the hard way, like needing a

hook and rope to walk through the mountains or to raise or lower yourself through dungeon holes.

If already addicted to this form of game *Ultima*, you will enjoy *Questron*. It doesn't have the same feel and isn't quite as satisfying, however. One of the strong points is the finale. Things really pick up when you get near Mantor and the conclusion differs quite a bit from many other fantasy games. Despite the length of the game, the finale itself almost makes *Questron* worth playing.

THE RETURN OF HERACLES

Quality Software
$32.95
48K

Overall Rating	B	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	C	B	*Value for Money*
Graphics	B+	9	*Save/Restore*

In this Hi-Res fantasy role-playing game, you play the part of one (or more) ancient Greek heroes. Music accompanies the copious text, heavy on Greek names, which describes the ancestry and nature of the characters with an emphasis on Greek spelling and lore. This makes things a bit difficult for the layman. Just stick with it and you may learn a bit about Greek mythology, most of it (but not all) accurate. The graphics, although well done, don't show a great deal of detail.

You must carry out twelve charges from Zeus, such as ridding the countryside of creatures gone berzerk. Quite often, while pursuing a given quest, you will inadvertently solve another. The computer tells you so and awards you a number of points depending on your efficiency and how many characters you lost in finishing the quest.

If you have previously played *Ali-Baba and the Forty Thieves*, you will recognize many of the subroutines, which have been carried forward unchanged. Chief among them is the ability to start a fight between two or more roving characters and then retreat to watch them battle it out. Also like *Ali-Baba*, the puzzle content is minimal. Mapping is possible, but tough; you'll need a combination of rough maps and notes to find your way back. A number of small pillboxes dot the landscape. When you enter one, you find yourself in a new land or location, often with more little pillboxes which may either return you from whence you came or send you on to a succession of more lands. Here, there, and everywhere you'll find roving characters, most of them not particularly friendly. You have the option of running away (often successful) or taking them on. It's sort of tough to keep your initial character alive, but you can get better armor and weapons for a price and invest in various forms of training (also for a price). You get the gold for all this good stuff from treasure chests, often left behind after you've polished off a bad guy. During battles, which seem a bit long, the screen displays humorous if somewhat repetitive text.

You can play the game with either the keyboard or a joystick. The documentation doesn't really tell you how to play, but it goes to great lengths in describing the attributes of the different good and bad players. Pushing the space bar displays options available to you, which continue on another screen (also called up by the space bar). To choose an option, you press the proper direction key or move the joystick in the appropriate direction. You can save nine saved-game positions to a scratch disk at any time, but you can recall them only at the outset of the game. Also like *Ali-Baba*, the game becomes quite lengthy if you try for all twelve quests, as well as repetitive. It is, however, good, clean, bash-'em-up fun.

SUNDOG— FROZEN LEGACY (Version 1.0)

Oasis Systems
$40.00
64K; II+

Overall Rating	B	Medium	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	D	B	*Value for Money*
Graphics	A	1	*Save/Restore*

This lengthy fantasy role-playing game actually consists of a souped-up version of *Galactic Trader*. Zed, your character, has inherited Uncle Brock's freighter spaceship and with it his contract to fulfill the needs of a new colony on the planet Jondd. At the outset, you know nothing about either the freight business or how to fly your spaceship. You'd better learn within an hour or so if you expect to cope with the twelve galactic systems and their eighteen planets and fifty-seven cities, many of which you visit nine times to buy and sell the twenty-nine trade goods randomly available.

Despite the complex commands, you play *Sundog* with a joystick used much like a mouse. You even create your character with the joystick, although the package offers no explanation of how various attributes affect the play of the game. *Sundog* has a pleasant degree of detail: the planets move in orbit; nifty low-

fuel warnings appear; you are offered only what you can afford at the exchanges; and when you complete the game, the word "Won" appears in the eight-character roster on the utility side of the disk. In addition, the game has excellent Hi-Res text and graphics.

In keeping with your initial ignorance, the fancy documentation doesn't tell you diddly squat about how to play the game, operate your spaceship, how to obtain objects that enhance your ship's performance (you don't even know what they are), or how to cope with the endless army of space pirates out to rob you blind. You'll find it nearly impossible to handle these rascals because employing your guns and shields uses fuel at an alarming rate; besides, control of the ship is very difficult at best. Try waiting until they get close (as you continue to approach your warp point), then bluff your way past them or, failing that, use your cloaker (if you bought and installed one and have enough fuel to run it). Failing that, go back to your single saved-game position. This weak option forces you to suffer through the long boot cycle each time you use it.

Despite the slowness of play in certain parts, I thought *Sundog* fun to play albeit somewhat repetitious because of the nine phases in finding, buying, and delivering goods. When you succeed, the weak ending hardly rewards all the work you've put in; it simply says, "You Have Completed Your Contract" and congratulates you. The company plans to send a newer version to all owners of the first version. The newer version supposedly improves the ending and several of the weak points of the game. Until then, I think kids will enjoy the game, but oldsters may soon tire of the repetition.

TELENGARD

Avalon Hill Microcomputer Games
$28.00
48K; II/II+/IIe/IIc

Overall Rating	F	Medium	*Challenge*
Creativity	F	N/A	*Vocabulary*
Documentation	B	F	*Value for Money*
Graphics	F	∞	*Save/Restore*

Telengard is a black-and-white fantasy adventure game that has taken the best elements of *Wizardry*, *Ultima*, and *Temple of Apshai*—adding nothing new—and squashed them into a 110-sector Applesoft program. The basic concepts survived, making for a decent game, but the implementation is atrocious. Your character is an "X" on a text-page approximation of *Apshai's* overhead view of the dungeon, with your attributes on the right. The symbol # marks the monsters, three cryptic letters mark various features, and $... well, you know. There is no stated goal, although the writers try to help you create one. Just head for the dungeon, whomp monsters, get whomped, find gold and magic objects, and gain experience—as well as spell levels—so that you can go and whomp some more. You'll get killed often at the outset, but it's easy to build yourself into fighting shape by sitting below an inn and letting the monsters, gold, and magic objects come to you. Then pop up and save your character at the inn, where your hit and spell points are restored. The only trouble here is that you are then kicked out of the game.

Telengard was apparently written for a different computer; no one would ever have designed it this way for an Apple. No typing of any words is required. The command keys use A, W, D, and X for West, North, East, and South. The program also uses both P, H, S, and Control P, H, S. There are six levels of magic spells and six spells per level. You cast a spell by pushing a number for the level and then a second number for the specific spell. These curious mixtures prevent the commands from ever becoming automatic. The game is played in real time. If you don't move fast enough, a move-in-place is made for you, giving monsters a free shot. Even the Help command display disappears after a certain time. If you are in combat and you aren't fast enough, the monster gets a free shot. If you evade combat, the computer moves you randomly away.

While the game plays in real time, the worst part is that you must wait an eternity for the move cursor to return. The game is very slow. The Apple's one-key rollover can really confuse you. Following each move, the screen clears, is slowly redrawn, with you in your new location, and the move clock starts. These unnecessary complications make the quasi-mandatory mapping of the various levels difficult. For that matter, getting the timing down to play this game just isn't worth the effort. However, the packaging is nice.

TEMPLE OF APSHAI

EPYX
$27.00
48K;Apple II/II+/IIe/IIc

Overall Rating	B+	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	B+	B	*Value for Money*
Graphics	B	∞	*Save/Restore*

Fantasy, adventure, role-playing, and maze adventure are all names applied to the type of game that gives

the player certain attributes in order to accomplish a certain goal or task. *Temple of Apshai* is a good example of this type of game. The player must utilize his attributes such as dexterity, intelligence, fatigue, etc., to fight his way through a maze populated with monsters and other untoward dangers.

This is the longest and most versatile of the Dungeonquest series. The Dungeonmaster program allows one to create his/her own characters; alternatively, one can let the computer choose character traits and abilities at random. The player explores the rooms of a multi-level dungeon on a Hi-Res screen. Your character moves around from room to room, confronts monsters and battles them with his various weapons. All this is done with shape tables, including fight sequences complete with sword thrusts. The game has a choice of numerous difficulty levels and play options. Games can easily last for hours.

The author has shown as much thought in preparing the documentation as in writing the program. The documentation includes a "Book of Lore" which not only relates how to play the game, but provides the player with the background and mechanics of fantasy role-playing games in general. This is an outstanding Hi-Res game, with thoroughly readable documentation and packaging.

ULTIMA II

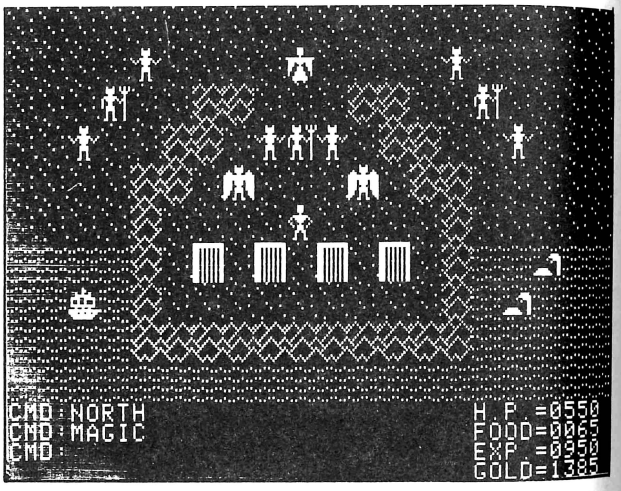
Sierra On-Line Systems
$59.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A+	Medium	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	B	A	*Value for Money*
Graphics	A+	∞	*Save/Restore*

Ultima II is the long awaited follow-up to the original *Ultima*, a fantasy role playing game by Lord British. It seems that we veterans of the earlier game were mistaken: when we finally killed Mondrain, we didn't find and deal with his apprentice, Minax. Now that she has come of age, she is even more powerful than her predecessor; so too is *Ultima II* compared to its already classic predecessor.

More than a simple successor with new maps and a new challenge, *Ultima II*'s three disk sides take you to several towers (upside down dungeons), villages, five time periods, and ten planets, in addition to the towns, castles, and dungeons that players of the original game will remember. This time, towns and castles, as well as villages, are in the colorful, multi-screened scrolling form that so distinguished *Ultima*. Each of their layouts and contents are different, except that one of the castles appears in two time zones. There are time portals, horses, ships, airplanes and rockets to ride around in. Fewer dungeons and towns provide a more balanced game.

The commands are generally the same, but have been streamlined by dropping those which were seldom used and adding two more useful ones: an interrupt, (Y)ell, to permit taking a breath or for thoughtful planning, and a (V)iew command which provides an excellent single screen graphic of the location in which you are currently scrolling your merry way. Without it, *Ultima II* would be a mapmaker's ultimate challenge; as it is, mappers will have plenty of action in the dungeons which seem to go on forever. The command execution time is also pleasantly speeded up over the original. The game even comes complete with a neat cloth map representing most of the time portals on a "from-to" basis; it's pretty, but not much use in the game.



To achieve the goal and rid the universe of Minax, your fantasy character (your choice of four races, three types, two sexes, and six allocatable attributes) faces many hours of searching, interrogations, and monster whomping. The monsters serve as a source of gold, and there are many ways and means to spend your hard earned loot; many are mandatory if you are ever to succeed in winning. You only need to obtain two objects to defeat Minax, but both take time, thought, and money—so it's back to whomping monsters above, on, and below ground.

There are a few bugs, but none fatal. As a hint, load up on Strength at the outset, as it's the one attribute that can't be increased. Also, don't exit the town if any attribute goes over 99, unless you're rolling in gold. My only gripe is that it has the same save-game routine as in the original *Ultima*. While you can save it at any point to your player disk, it can be recalled only on Drive 1 through the lengthy rebooting cycle. And you will be

restoring this game frequently. Yet such defects pale in the face of this graphical tour de force. Whether you played the first version or not, this one is a must.

ULTIMA III

Origin Systems
$59.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B-	Hard	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	B	C	*Value for Money*
Graphics	A-	1	*Save/Restore*

Ultima III is third in the series of Hi-Res fantasy adventures by Lord British. Drawing heavily on elements which made *Ultima II* and the *Wizardry* series successful, *Ultima III* combines them into an awkward, lengthy, and rather less satisfying game than its predecessors. Players of *Ultima I* and *Ultima II* may recall dispatching the demonic Mondain and Minax. In *Ultima III*, your task is to seek out and destroy their creation, Ultima. Your object: to become powerful enough to deal with him. As in the other games, you build your character's experience and gold supply by slogging around (and underneath) the countryside, doing battle with various and sundry monsters. Your party consists of four members, each with unique spell, armor, and weapon-handling capabilities. Unfortunately, I did not feel as involved with these characters as with those of the *Wizardry* series; and because there are four of them, the game lengthens by a factor of four. Luckily, some interesting elements have been added. For example, you must explore at least two dungeons to find four marks and the Lord of Time. There are also four shrines at which you can beef up your attributes (if you have enough gold) and find the four cards needed later. You must fight for ships which can sail only with the wind and must be destroyed by ocean storms for you to be successful.

As in the previous games, you need copious quantities of gold to feed and equip your men, bribe guards, buy tips from bartenders, and buy the Oracle's clues (4,500 gold pieces for these). You obtain this loot in countless monster whomping encounters during which you also build up experience and, with the King's blessing, your hit-point capacity to a maximum of 2,550. You can also find large clumps of loot while wending your way through one of the mazes in Death Gulch or on certain dungeon levels. Once your character is strong enough to survive, you explore the many dark areas, piece together all the clues, find the necessary marks and cards, and finally, take on Ultima.

Unfortunately, you cannot access your character's status and equipment prior to beginning play, nor can you change the characters in your party from within the game. You can save the game by pressing the Q-key; otherwise, the program automatically saves the game every time you enter or leave a dungeon or town. You cannot restart the single Saved-game position from inside the game; instead you must reset or shut off the power. Also, you cannot shorten the lengthy boot cycle as you could in *Ultima II*. Generally, the interesting challenges offered by the game almost offset the monotony of the battles and the countless unnecessary key pushes. Inveterate fantasy gamers will love the game, but most neophytes will give up after the first 200,000 moves.

WIZARDRY

Sir-Tech Software, Inc.
$49.95
48K; II/II+/IIe/IIc

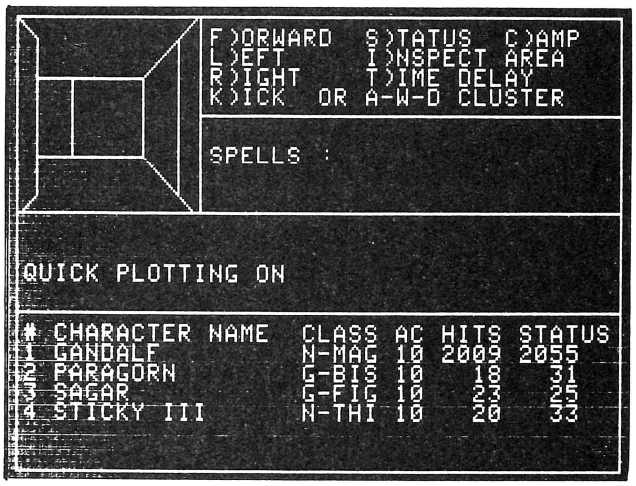
Overall Rating	A	Medium	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	D	A+	*Value for Money*
Graphics	A	∞	*Save/Restore*

Wizardry is a sophisticated and professional Dungeons and Dragons game that realistically follows the original board game. Put another way, it's a program that combines the better features of *Beneath Apple Manor*, the Eamon/Swordthrust series, (parts of) *Ultima*, and *Dragon's Eye*, in addition to throwing in a number of new ideas of its own to produce a very detailed and interactive "kill the monsters and get the gold" type of game.

The two-sided disk provides a Program Master and Scenario I entitled *Proving Grounds of the Mad Overlord*. The clear implication is that there will be more scenarios to come. Written in Pascal (the P-Code does *not* require a Language Card), this multi-menu game is very fast in its response to commands and is only occasionally disk interactive.

The game provides the player a degree of control over character selection and control seldom found in a computer game. Up to six characters at a time are put in play, chosen from five races, three alignments (good, bad and evil); each may be of eight different classes, with its own unique capabilities and limitations. Monsters are many and varied, magic spells abound, and the dungeons are seen in 3-D perspective in one corner of a well laid-out and informative screen. Inherent in the game's design is an excellent save-game concept, whereby different players can store many characters, each protectable by a "password."

All is not peaches and cream, however. The game is long and involved, while providing little insight into how the interactions are designed. It also requires considerable time and effort to develop characters that can survive in the dungeons long enough to advance to a higher level where new spell capabilities and character attributes are garnered. Despite unusually informative displays and complete documentation, the combat phases will require repeated reference to both the spell lists and the player's notes. While an option to run from combat is provided, it usually results in total destruction of your party, as the monsters flail away at you during your attempts to flee. No breaks.



Wizardry has too many options and character preparations to rate highly with young kids. It is directed more towards serious D&D enthusiasts. There are no puzzles to be solved, but planning and thought are mandatory, as is the mapping of the dungeons. Even if you've been put off by earlier Apple D&D versions, you should give *Wizardry* a long, evaluative look as it's a complete and legitimate fantasy role-playing game.

WIZMAKER

ARS Publications
$20.00
48K; II/II+/IIe/IIc

Overall Rating	A	None	*Challenge*
Creativity	N/A	B	*Graphics*
Documentation	B	A	*Value for Money*

Wizmaker is a character editor for the fantasy game *Wizardry* and its two sequels, *Knight of Diamonds* and *Legacy of Llylgamyn*. What it essentially allows you to do is cheat. Ethics aside, a substantial need for such a utility exists. The *Wizardry* program keeps track of all characters and their status on the disk. While the authors have always advised keeping a back-up character disk using their utility, most players don't heed the advice. I, for one, not reading the instructions carefully and forgetting to buy armor for one character, managed to disband before entering the dungeon. Well, my characters certainly weren't lost in the dungeon, although they were listed as "out." Fortunately, I wasn't too attached to my characters so I didn't mind the loss, but others who have trained and fought with characters that they considered "family" are sometimes deeply grieved at a character's death. This character editor can resurrect the dead and recover lost characters.

Wizmaker can change nearly any character's features. This includes in/out status; whether a character is dead, paralyzed, stoned, evil, good, etc.; its alignment, age, experience, attributes, and hit points. You can modify your name, password, race, and class. The editor can alter the number of spells available for each level and gives you the choice of which spells the character knows. Thus you can easily create characters of super-hero status (ten thousandth level).

The program is simple to use. It is completely menu-driven. Most values remain unchanged with a simple carriage return. The entire set of twenty disk characters reads into memory at the same time. After analysis, the program allows you to display all the characteristics either to the screen or line printer. You can then enter the modification mode to change their characters any way you please. Upon completion, the twenty characters are written back to the disk. Error trapping and reliability are excellent. While unlikely that the program will ruin an original disk, you should probably modify a duplicate scenario disk, made with the Apple copy program on the DOS master.

While purists will call such a program blasphemy, the frustrated *Wizardry* player who has been unable to venture past dungeon level two will find this program a blessing. And for those itching to play *Knight of Diamonds*, the *Wizardry* sequel that requires thirteenth level characters, this program provides a quick short-cut to creating some. The program includes maps to several of the dungeon levels for the first scenario.

War Games

General and Space

COSMIC BALANCE

Strategic Simulations, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	Hard	*Challenge*
Creativity	B	B-	*Graphics*
Documentation	B	B+	*Value for Money*

Cosmic Balance is an action-strategy war game whose concept is similar to that of *Warp Factor*, another game by Strategic Simulations. *Cosmic Balance* not only allows you to pilot many different-sized ships, it also allows you to design your own style of ship. There are many scenarios for play: a deep-space encounter, a planetary raid, a commerce raider invasion, a dogfight, or a surprise attack. One person can play this game against the computer, or two people against each other. In the first case, playing ship to ship, the game lasts from 30 to 60 minutes. In the second case, also ship to ship, playing time is two hours. You can save the game after every turn; and these easy exits allow you to return at a later time. You can also continue your game after a save, which lets you try a tricky maneuver without losing the game structure you have built up.

There are six technical levels and six different sizes of ships. You pick your level and size. Then the computer assigns an appropriate number of "spaces," which you use for building equipment, weapons, firing angles, and more. For example, a photon torpedo takes two space units to build. Now you have a photon torpedo, but where does it fire? Well, the ship is divided by 45-degree angles, creating eight firing arcs. After you have paid for the weapons—the photon torpedo, for example—you must then pay for each arc you wish to fire through. Your shield is also set up with the same arcs. There are up to twelve weapons with which you can fight, as well as up to five ships you can have on your side.

The graphics are average, but they serve the purpose of this game. *Cosmic Balance* is an action game, because it responds visually as it goes through your maneuvers and it fires when you tell it to. It is a strategy game because you plan a very tricky maneuver to set a trap for your opponent. You can coordinate an attack when you are using four or five ships at one time.

If you like competition, you will like this game. No ship is perfect, and it takes more than hand-eye coordination to do well. Winning combines your piloting skills, ship design, firepower, shield strength, maneuverability, planning, and, of course, luck. With this game, you can challenge a friend to a space battle—to the death.

IMPERIUM GALACTUM

Strategic Simulations, Inc.
$39.95
48K; II/II+/IIe

Overall Rating	B+	Hard	*Challenge*
Creativity	A	C	*Graphics*
Documentation	B+	B+	*Value for Money*

Imperium Galactum is an operational-level space game of exploration and conquest in a star cluster. You build an empire and control its many facets. The winner is the player who has the largest population under his command when you decide to quit. Each turn consists of five years in length, and goes through a number of phases.

In the Trade Phase, the objective is to create and/or trade food, iron ore, or military money called Mil. IOs. You adjust population and mining controls, adjust negotiation status, and break trade agreements with other planets in the Control Adjustment Phase. The Production Phase allows you to build ships, defense bases, and armies, develop planets, and spend IOs (non-military money) on research. The Negotiation Phase is for changing your own diplomatic stance, negotiating with computerized players, and learning about agreements with independent planets. To move

ships between task forces in the same planetary system, load and unload transports on friendly planets, and order task forces to go on missions you use the Movement Phase. Finally, ship to ship or ship to planet combat happens in Combat Phase.

The program comes with an 8 by 12 inch, nine-page rule book that is literally packed with information. The definitions of game terms alone take about two pages. Nearly all the terms have either a functional or functional/mathematical relationship to one or more of the other terms. For example, here is an excerpt from the rule book: "Industry (IND) is what is used to manufacture the IOs and Military IOs needed to construct new ships, develop planets, and increase your technological level. Each industry produces three IOs and two Military IOs and requires one and one-half population points to operate." There are about fifteen of these functional/mathematical relational terms with about twenty-two terms that are only functional.

The sequence of play in each turn has seven major phases: the five above, and another set of Movement and Combat Phase. The rule book goes into considerable detail about each phase. In fact, plan on spending a lot of time reading.

While playing the game, you have to keep track of too much information on your own. During each phase, you can only see information about that phase. Since all phases affect each other, you should be able to make decisions based on the entire situation, not just one aspect. You may find it necessary to keep a written record of your status. In general, the program runs slowly, but that gives you lots of time to think.

Strategic Simulations provides a hot line (at your expense) if you have problems or questions. Their personnel are very helpful and courteous. They also offer a warranty on the disk for the first thirty days, but still require a $10 replacement fee for defective disks.

Imperium Galactum is quite complicated and time-consuming to learn. The graphics are sufficient in some respects, but overall they could do more to enhance enjoyment and to help you along. For the player who relishes the challenge of highly strategic gaming, this may be the ultimate test.

LORDLINGS OF YORE

Softlore Corporation
39.95
48K; Apple II/II+/IIe/IIc/III in emulation

Overall Rating	C+	Medium	*Challenge*
Creativity	B	A	*Graphics*
Documentation	A-	C	*Value for Money*

Lordlings of Yore is a tactical medieval battle game with good chunks of economics and strategy thrown in—basically, a neatly disguised war game. Four persons (up to three of them represented by the computer) contest for the crown, which is won by capturing a foe's castle or defeating his Lordling in battle. A friendly Necromancer helps each Lordling by casting magical spells, but you can only buy or use one spell at a time. Each player deploys his knights and men from his castle and moves them to attack from the quarter of the graphics board that belongs to him. Each computer player can take a full thirty seconds to decide what to do, so be prepared for a long game if you take on three of them.

The text formatting and associated displays are very well done, as is the combat resolution phase with one exception: nowhere can you find an explanation of how the frequently displayed Random Factors and Modifiers affect combat. The graphics display shows your Shire in excellent detail, with neatly drawn and well detailed shapes. Mountains, towns, hamlets, swamps, and forests (in controllable quantities) surround your castle. Each different game produces a different map. At the end of your turn, an Options phase permits you to dump to a printer the map of your Shire and as much of the opposition's territory as you've occupied.

The Options phase also permits you to save the game, but you can only call in the saved position on the boot cycle. Even so, I suggest frequent saves because my disk periodically rebooted between phases of the game—a minor distraction. It would have been more tolerable if the save game feature supported two drives.

The biggest danger is resting your finger on the Return key; pressing Return ends the current phase and you cannot return to it. Similarly, you cannot back up to check a location or army unit once you enter the Necromancer phase. You must know what you intend to do before starting. Also, you cannot easily look at the constituency of your army as often as you'd like, and you can not easily determine if an enemy flag covers but a single man or a mighty group of thirty-five knights. In fact, the loser of a combat doesn't know that he has lost—only the winner knows. If you play a computer foe, he ain't telling.

The documentation fully describes the game's features, pointing out the problem with the Return key

and your inability to double-check on things. It's vague on the models used for combat resolution and only hints at winning strategies, such as leaving a man in each occupied enemy town to collect the yearly taxes that pay your men and buy spells.

With all the obvious attention given to display design, it's a shame that they didn't add a few better concluding screens to mark the victory of a Lordling over a rival in the course of a game. At any rate, at the finale the game writes to disk the score of the new king and displays a multi-lettered verification code. All in all, *Lordlings of Yore* proved both interesting and rather different from the normal game, a bit on the slow side (when the computer takes the part of your foes), but challenging and enjoyable nevertheless.

PARTHIAN KINGS

Avalon Hill Microcomputer Games
$25.00
48K; II+/IIe

Overall Rating	B+	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	A	A-	*Value for Money*

This strategy game for one to four players challenges your every move. You, king in the year 1250, must expand your empire by conquering your neighboring king(s) and taking over townships. *Parthian Kings* follows a logical sequence: collecting taxes, buying and deploying troops, organizing caravans, launching range weapons, and wizardry (optional). After each player takes his or her turn, the computer shows the movement and the results of any combat. Once you have completed these phases, one year of game time has elapsed. The computer tallies points and the player with the most points wins. You gain points through obvious maneuvers such as capturing an enemy king or wizard. Other conquests, such as occupying a lake space or capturing a convoy master, contradict the game's logic.

You can play for a fixed number of "years" or to the death. The latter can easily last from three to four hours because of the time it takes a computer controlled king to calculate his movements. I would have liked a save-game option here. In the shorter version, the key to victory is hanging on to the lakes (one point per year) while staving off your enemies. Strategy wins the fight to the death. You must decide such things as whether to leave a valuable division on a lake space or use it for battle. Your units have certain attributes such as strength, the ability to withstand a blow, movement capability, and range of fire. The higher the attributes, the more expensive the unit. You must become skilled in using the weakest and strongest units to their full capacity in order to achieve victory.

Parthian Kings challenges your strategic ability and patience. You cannot merely buy a large army and conquer your enemies. At the beginning of each year, you must fix the tax rate. If it's too high, people simply leave town, leaving you with less money. Conversely, a low tax rate induces more peasants to move in, thus increasing revenues. A conquered town pays taxes to the conquerer.

All in all, *Parthian Kings* is a well-thought-out game and is easy to play. The program is challenging and never boring because you can opt to make your own scenery. It's definitely a great way to lose yourself for a weekend—if you have the time.

RESCUE RAIDERS

Sir-Tech
$39.95
64K; II/II+/IIe/IIc

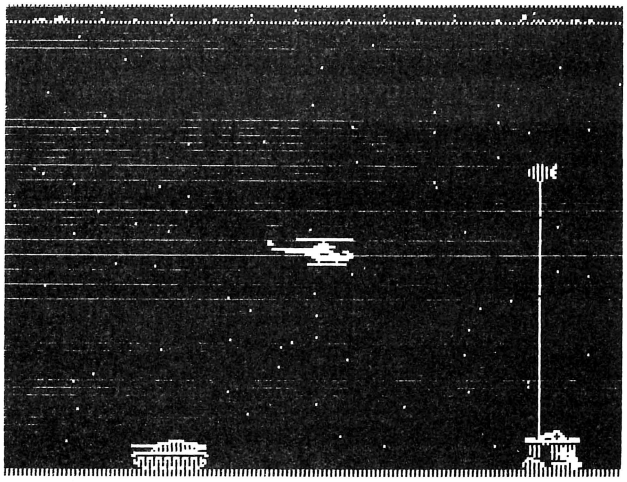
Overall Rating	A	Hard	*Challenge*
Documentation	B+	B+	*Creativity*
Value for Money	A	B	*Graphics*

The proper combination of arcade action with strategic play can produce an entertaining game for adults. *Rescue Raiders* combines a good arcade helicopter simulation like *Choplifter* with the strategy of a fast-moving real-time war game. The object here is to quickly beat the computer controlled enemy using the least amount of forces. It is a game in which you are penalized for squandering resources or dragging out the war's length, because nations at war always suffer both economically and with lost lives. It is quite common to play *Rescue Raiders* and end up with a negative score.

The player manipulates a joystick-controlled, highly maneuverable tactical helicopter. It is capable of strafing enemy infantry, bombing ground vehicles, or transporting troops. Like real helicopters, it needs to be re-armed and refueled frequently at its base near the time machine at the far right of the scrolling battlefield.

The rest of your army—tanks, mobile anti-aircraft guns, demolition team vehicles, infantry and engineers—are deployed by keyboard commands. Each costs a certain amount of money to deploy. Once on the battlefield, the armies fight automatically. You provide the air support with your roving helicopter and assist them when the going gets tough. As you advance deeper into enemy territory your supply line becomes longer. Also, the enemy deploys mobile and ground-

based antiaircraft guns that can shoot your helicopter down with amazing accuracy. Demolition teams need to be sent out ahead to destroy these installations, but they must also be protected from the ravages of the enemy's nearly invincible helicopter air force. The difficulty here is that the computer's helicopters are suicidal. (Why not? The computer has an unlimited supply.) The trick is to learn how to swoop and dive, evading the helicopter while you bomb and strafe. You can see the enemy copter coming on the radar display at the top of the screen. Then there is always the trick of luring the enemy into one of your barrage balloons, but that tactic runs out with your supply of balloons. The enemy also has a big army of assault vehicles followed by numerous ground troops. You will have your hands full.



The game, which is incredibly realistic, has eight levels. As the war progresses, especially on the higher levels, technology advances and new weapons appear. Repeated success is the only way to advance through the levels. Since it can take many hours to get that far, there is a game save feature.

The playability of *Rescue Raiders* is excellent. Victory requires a combination of tactics and strategy. Arcade skill is only a minor part of the game. The graphics are detailed: smoke pours out of the helicopter when it is damaged; parachutes sometimes fail to open. Surprisingly, sound effects are absent. But considering the amount of computation required to produce a real-time war simulation, that is probably necessary. In sum, I would highly recommend this war game to older teens and adults who find arcade games superficial. *Rescue Raiders* will hold most players' interest for hours.

SPACE STATION ZULU

Microcomputer Games
$25.00
48K; II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Documentation	B	B	*Creativity*
Value for Money	B	C	*Graphics*

Momma, don't let your children grow up to be Yargs. It's hard to be a Yarg. Aliens won't let you alone; you're outnumbered and too tasty to be overlooked. And what's more, those aliens multiply like Venusian rabbits. Of course, if you insist on playing, you have only one choice: you have to be Captain of the Yargs. And you have to fight the aliens or they'll eat you.

Still want to sign up? Let me explain a little more. You have sixteen active Yarg troops, with thirty-two others in the deep freeze. When the conditions are right, and only then, you can unfreeze up to two Yargs per turn. You also have four robots, who are pretty strong. In fact, as a last resort, you can program the robots to self-destruct and wipe out a whole roomful of aliens. But Space Station Zulu has twenty-nine rooms, and the aliens keep multiplying and moving around. Spores become larva, and larva become hungry, dangerous adults. So you'd better keep your robots alive as long as you can.

You get to choose the difficulty (normal, difficult, or "little hope") of the situation you want to tackle; don't get too self-confident, there's little enough hope for you in the normal mode. You can find weapons scattered about the Station, but you'd better be careful with them. They're untested, so some won't work. Some even make the monsters grow! Testing a weapon reveals its effectiveness rating, but that won't help your poor dead Yarg(s) who tests the bad ones.

You can issue orders in any room with troops and/or robots which they will faithfully attempt to carry out. But they're not a very martial group, and they often fail to carry out their tasks. Don't worry though, you won't have to reprimand them; they probably won't survive.

After you've given all your orders, you process the turn. Then you get to see if you won the skirmish or not. Personally, I got tired of dying. That's why I'm offering you the job.

Well, the game is a bit too slow and ponderous (that's the way *Applesoft* is); the graphics are nothing to write Earth about, and the action may not be for everyone, but a really fine military tactician might have a chance. Do you have the Right Stuff? Want to try your hand fighting aliens in Space Station Zulu? You can have the job. I'm finished.

WAR IN RUSSIA

Strategic Simulations, Inc.
$79.95
48K; II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Documentation	C	B	*Creativity*
Value for Money	B	B+	*Graphics*

The game of war has been going on for untold centuries in one form or another. It's not just a matter of men killing each other, but of planning, strategy, and forethought. You can look back on history and say to yourself, if this and that were done differently, it would have changed the whole outcome of the war! With this game, you can do just that. The results of German and Russian combat in World War II are known. Now, it's your turn to see if you can do it differently.

War in Russia is one of SSI's line of strategy games. In this scenario, the Axis forces and the Soviet forces battle it out in the time frame of 1941 through 1944. The area covered during this division level game is a large thirty-one by thirty-two hexagonal grid, with each hex representing fifty miles. Each hex area is displayed individually on the Hi-Res screen, showing what type of terrain it contains. Your job is to win, or at least survive.

When you first turn on your computer and load *War in Russia*, you are offered several levels of play, three locations (Barbarosa, 1941, Case Blue, 1942, or Zitadelle, 1943), and either a single or two-player game. You can restore a saved game, start a new one, and define the number of drives in your system.

The sequence of movements and action break down into seven units:

1. Axis group adjustment/build phase
2. Soviet group adjustment/build phase
3. Soviet supply phase
4. Soviet movement/tactical plot phase
5. Axis supply phase
6. Axis movement/tactical plot phase
7. Tactical execution/combat phase

All of the first six steps are executed in step seven, when the actual movement and fighting all take place. Depending upon your planning and forethought, the battles and troop movement will advance your troops into more decisive positions, possibly even taking over an enemy city. Your chances are controlled to some extent by such things as fatigue, experience, terrain, and weather. The most important factor of all, though, is strategy, just how well you can think-out and execute your plans. And, of course, this is what the game is about.

I found the program extremely detailed and accurate. Others that I invited to play were also extremely impressed with the quality of the workmanship and planning that went into this program. I did find the documentation a bit lean considering the amount of information that it attempts to cover.

If you play the "short" game, you can use close to twenty hours, while the long game can take well over 100 hours. Thank goodness that you are able to save the games to disk and recall them later. Even so, it's hard to close down the computer at two A.M. when you feel that you at last have the enemy on the run. This game can provide many hours of fun, especially if you have some experience playing similar war games. Who knows, maybe even I can come up with an Axis decisive victory instead of a Soviet victory for once.

THE WARP FACTOR

Strategic Simulations, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C-	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	C	*Value for Money*

Strategic Simulations has applied its tactical war gaming techniques to a Trek-like encounter in outer space. Your mission is to inflict maximum damage to the enemy; hopefully, without being destroyed yourself. The game has the same familiar feel, strengths and weaknesses of SSI's earlier programs, especially in regard to slow playing speeds.

The dominant element of the game is the management of a tight energy budget, intentionally made rather restrictive. The rules and requirements for this task are extensive, but in order to become a proficient player, they must be learned by experience. Beyond that, a movement phase, including three sets of combat commands, and an interminably long computer movement/combat resolution phase carries you through to the start of the next move. After checking your status, looking at a so-so Hi-Res situation map, it's back to allocating your energy again.

Four solitaire and one two-player scenarios are available, with the player having his choice of twelve types of ships, each with its particular armament, protection, and (to a degree) performance characteristics. The above similarity with the more highly-modeled war games, such as Air Combat and Bismarck, ends rather abruptly. The game is a rather long, two-dimensional, outer space "attack" game, but without a save-game option that would have been helpful for avoiding a rather bored feeling that develops after several turns.

of probabilities—and by seven different performance characteristics for each man.

If this review sounds familiar, it's because up to this point it's very similar to the initial 1981 review. The packaging, logo, graphics displays, music, sound effects, and all of the old commands are identical to those of the original version. For that matter, the game itself is identical, except for several added frills. The principle difference is that this version is much more playable due to a faster resolution of the orders by the computer. While the original version took at least 5.5 minutes for six men to execute three seconds of action, the new version breezes through the same three seconds in twelve seconds of computation, no longer interrupting the game's continuity. It is easy to become—and to remain—interested and involved with your men and the tactics. The new documentation, better organized and better written, has more detail and examples. Nevertheless, it is not easy to follow, for the game is complex. The documentation should remain close at hand for at least the first few games. Despite the improvements, several confusing factors remain. For example, there is no mention of any difference between a rifle, an automatic rifle, and a machine gun regarding different rates of fire, although different accuracy and weight factors are specified.

You may save a game position at the start of each turn. Prior to that, you may create a customized squad, complete with names of your choice. A disk management menu at the start of a game permits a save-game disk to be initialized as well as to catalog and delete games or squads from the scratch disk. The characteristics of the squad taken into battle may be dumped to a printer for reference during the game. New commands, such as dropping a weapon or looking for and getting a dropped item, have been added. Despite the new features, the game has a few weaknesses. One is the irksome necessity of having to order a man to reload his weapon and fall down before starting to crawl. Neither has the original, unsatisfactory conclusion been changed. After the simple text announcement that a certain side has won, it is possible to review the last turn, but there is no information as to the status of the computer's men. This is so despite a major emphasis on giving you a feeling for all combatants as individuals rather than as faceless opponents.

The game is well worth the time needed to learn it. Despite a few remaining quibbles, the degree of improvement in this version of *Computer Ambush* is nothing short of miraculous. What had been an impossibly slow game with an excellent concept is now interesting and challenging, with that same concept brought crisply to life.

CRUSADES IN EUROPE

Microprose
$39.95
64K; II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Documentation	A	B+	*Creativity*
Value for Money	A	B+	*Graphics*

Crusades in Europe is a command or division level war simulation of the battle of France and the Low Countries during the summer and fall of 1944. Unlike many of the Strategic Simulations war games that use complex commands, *Crusades* operates in accelerated real-time and incorporates a user control system that is both easy to use and joystick controlled. You command either the German or Allied army and play any of the five variable scenarios against another person or the computer. The battles include: the battle for Normandy from the D-Day landings to the liberation of Paris; the Allies' race to the German Frontier; history's largest airborne assault, Operation Market-Garden (the subject of the film *A Bridge Too Far*); the German counter-offensive known as the Battle of the Bulge; and a campaign game that begins on the Normandy beaches and ends at the Rhine.

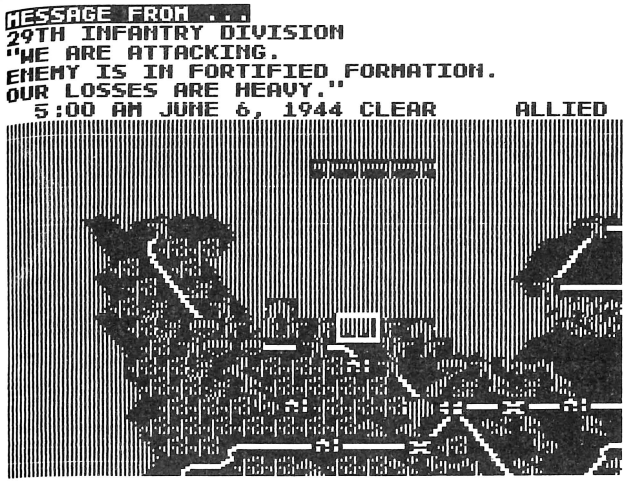
The battlefields are large scrolling maps (some of the smaller battles are on a single screen) based on a hexagonal grid of colorful terrain features. The type of terrain determines movement and favors certain modes of combat. The battlefield units or divisions (one per square) consist of infantry, armored, airborne, fighter/bomber, and headquarters. These are displayed as either icons or symbols (your choice). While the Germans, lacking sufficient airpower, used their airborne troops as infantry, the Allies used their airpower effectively in fair weather. The Race for the Rhine scenario does let you use airborne troops in the middle of the battle. However, most scenarios begin after the airborne troops have already landed, like at D-Day or in Operation Market-Garden. Initially, all troops are programmed to follow the historical battle, but can be changed immediately. Orders are executed about every eight hours.

Orders are initiated with joystick or keyboard commands. Pressing the joystick button when the cursor is on a unit, enemy or friendly, displays the unit's strength, supplies, effectiveness, current orders, and destination. Pressing the button a second time accesses the command mode, and a choice of attack, defend, move, or place unit on reserve status. Once selected, you pick a destination square and either press the joystick's second button or the letter "H" for "Here." The game can be played entirely by keyboard control.

Combatting divisions are indicated by fighting icons on the battlefield and sound effects. For example, a

figure shooting a gun, a figure on its knees, or a question mark indicating a "What now?" status. Status messages also appear at the top of the screen.

A unit's effectiveness is determined in part by supplies and morale. If a unit's supplies are running low, its effectiveness is diminished and it may have to be placed on reserve.



I played two of the scenarios: D-Day and the Battle of the Bulge. Playing the computer at even advantage, the D-Day battle proceeded with historical slowness. I had little difficulty getting off the beach, but German reinforcements prevented me from capturing Caen, an important crossroads. It was slow going for weeks through difficult hedgegrove terrain in order to capture St. Lo with the assistance of four bomber squadrons based in Britain.

Playing the Germans during the Battle of the Bulge with a slight advantage against the computer was more enlightening. Bastonge fell early to a Panzer attack, and those tanks raced westward to capture towns and sieze an Allied supply depot while other divisions took on the remaining Allied tanks. It looked promising, but the Allied reinforcements and the difficult terrain wore me down. I wasted days attacking defended positions until the Allies cut my supply lines and I ran out of steam. This is one of the shorter games; two weeks with a playing time of 80 to 110 minutes, depending on the speed setting of the game. Fortunately, thirty-two games in progress can be saved on a disk.

Crusades in Europe is definitely one of the more playable war games. The control system for giving orders is very well thought out and simple to use. The game's constant time flow, detailed terrain, and supply and effectivenes considerations lend to the realistic feeling. Various degrees of difficulty are available against either the computer or another player, and with a choice of five war games, *Crusades* is possibly the best buy in a war game for the Apple.

GERMANY 1985, Second Edition

Strategic Simulations, Inc.
$59.95
48K; II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	B+	A	*Graphics*
Documentation	B-	A-	*Value for Money*

Are you a frustrated armchair commander looking for a realistic test of your combat skill? Strategic Simulations has the answer: *Germany 1985*. With forty to sixty battalions under your command, you engage in a NATO/Soviet conflict that ranges over 1,100 square miles of European terrain. Your objective: to control more towns than your opponent at the end of three and a half days (about twenty-one turns).

This game features the detail and complexity that mark SSI games. It offers nine distinct types of battalions, nine kinds of terrain, and provisions for hidden movement, air power, smoke, solitaire play, and much more. Extremely involved, combat resolution takes ten different factors into account. The net result realistically simulates modern combat, including the "fog of war" and the relative strengths and weaknesses of the opposing armies.

What distinguishes *Germany 1985* is a superb game system (evolved from the SSI game *Southern Command*) that makes the complex interplay of variables invisible to you. A Hi-Res color map (strategic or tactical) and a four-line text display give you a wealth of information to help you make your decisions. You move units individually with an average of three to four keystrokes to which the computer responds instantly. Best of all, the whole system works exactly as advertised. I didn't find any bugs and only a couple of minor, easily avoided quirks. For instance, automatic artillery fire sometimes chooses poor targets, but you can avoid this problem by firing manually. Finally, the game won't allow illegal moves, so you learn as you play. A word of caution: the game may frustrate you until you get a feel for the many factors affecting movement and combat. After that, the game system and commands become second nature.

Besides the copy-protected program disk, the package includes rules, a command summary and reinforcement chart, and maps for the two basic scenarios. Later, you can change the terrain and reinforcements to create new scenarios. The straightforward rules may seem skimpy at first because they merely outline game mechanics, but this approach highlights the simulation of reality. Given the mechanics, you'll have to expend some thought and effort (and suffer a few defeats) to develop winning strategies. If you're tired of killing

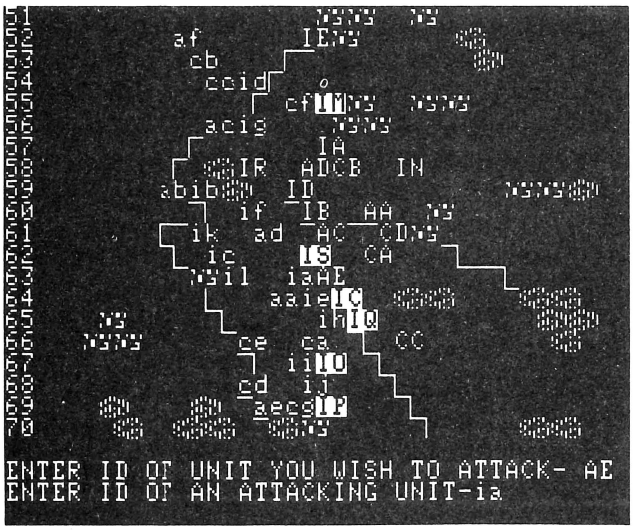
aliens and ready for a more serious challenge, get *Germany 1985* and step onto the battlefield.

NAPOLEON'S CAMPAIGNS: 1813 & 1815

Strategic Simulations, Inc.
$59.95
48K; II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	C+	B	*Graphics*
Documentation	D	B-	*Value for Money*

Napoleon's Campaigns: 1813 and 1815 is an historical, strategic simulation war game for one or two players. Each player is in command of a grand army, with units divided into corps. Communication between the corps is implemented through a dispatch system. Two scenarios are offered, Waterloo and Leipzig, each with its own Hi-Res map display, map board, and counter sets. The monitor display has a Zoom option which allows you to "zoom in" to a particular area for closeup views. The screen graphics, while good, could use some improvement; but the graphics of the mapboard, counter, and rule booklet are very nice indeed. There are variable troop movement allowances, weather effects, and hidden movements to add to the realism of the conflict. Games in progress may be saved to a scratch disk for resumed play later, a welcome feature, since it takes a number of hours to conduct a campaign.



Strategic Simulations claims that this game "set a new standard of historical realism" on the Apple. It does achieve this, primarily through the implementation of the dispatch system for issuing orders to your units. An unbroken "line of communications" must exist between the HQ command post and the particular unit in question to provide a good chance that your message will get through. Even then, there is no guarantee. It may take several turns before a dispatch reaches its destination, by which time the corps may have moved. Not only may messages be lost, but there is also the possibility that the corps commander will ignore the orders. This is an effective, accurate historical touch. Whether or not the orders are implemented enhances the realism of the contest, the "fog of war" atmosphere under which you play.

Bookkeeping is a necessity, because you must keep track of previously issued dispatches. This, coupled with the rather lengthy computation time of the program itself, makes for long sessions of war. The Apple, incidentally, when pitted against the solo player, does not seem to experience the same communications difficulties and so plays an excellent game. In effect, it cheats, so be warned. You must be considerably more cunning to overcome its advantage in this regard.

The rules could stand to be re-written, since they are terse and unclear in spots. If you are the type who likes to get involved in the action, then this game may proved tedious: as in real life at the command post, there are considerable stretches where you feel more like a spectator that a participant. But, taken altogether, *Napoleon's Campaigns* is an involving implementation of a strategy game from an interesting period in the history of warfare.

NATO COMMANDER

MicroProse Software
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Documentation	C-	A-	*Creativity*
Value for Money	B	B+	*Graphics*

In 1977, a retired British NATO general recruited six of his former colleagues to write a dramatized game plan for the next world war, which would hypothetically begin in Europe. The result was a unique book: *The Third World War*, by General Sir John Hackett (Macmillan Publishing Company and Berkeley Books, 1979).

Quite possibly, Hackett's chilling and dramatic account of this imaginary conflict inspired the authors of *NATO Commander* to produce this extremely challenging war game: a scrolling, real-time computer simulation requiring strategic thinking and fast-paced decision making. You receive, analyze, and react to a barrage of combat reports received from the battle-

fronts during a Soviet-Warsaw Pact invasion of Europe on May Day in the not-so-distant future.

NATO Commander is not a slow-moving, chess-type wargame; rather, it is an accelerated, real-time simulation of events as they might very well take place in Europe. Designed for solitary play, the program effectively commissions you as a four-star general who must deploy his mechanized and armored units, defensive reserves, and tactical nuclear weapons to stop the Soviet juggernaut. As the Nato commander, you'll receive continuous radio, teletype, and combat communications updates of the battlefield situation. You must respond to them, devising your own strategy and tactical plans to meet the Soviet onslaught and prevent a Pact victory.

NATO Commander features five possible European conflict scenarios, in addition to a demonstration scenario that automatically begins once the program has loaded. The conflict scenarios include a surprise Warsaw Pact attack against unsuspecting NATO forces; Italian and German battles (two different ones); and a preemptive strike by NATO on the Soviet Block. You may select one of four difficulty levels for each scenario. You may organize and manage your armies in larger division-size, or smaller brigade-size units. The former are more powerful and easy to manage, while the latter give you more tactical flexibility.

You enter commands via the joystick and/or by depressing designated keys on the keyboard (some fifteen keyboard commands are available). A flashing cursor desgnates the unit with which you are communicating. A joystick, as well as several keys, moves forces around the map. You can also freeze game play to study the situation.

The NATO simulation places a premium on the development of a sound overall defense strategy, though offensive opportunities occur as the drama unfolds. You can conduct air and nuclear operations, but, as in real life, the latter must be authorized by the Commander-in-Chief, and permission to employ nukes won't be given unless the battlefield situation is very serious—or if nuclear weapons have already been used by the Russians.

The measure of how successfully you're conducting the war lies in the Victory Points you accumulate. These consist of both political and combat points. Combat points reflect the battle situation, but various political events (which unfold as the game develops) also affect the overall outcome. Eventually, either NATO or the Warsaw Pact will crumble, ending the game and producing a game summary report.

I regard *NATO Commander* as a challenging strategic simulation that provide many hours of creative play. Using your imagination, the possibilities for game play variations are almost unlimited. Save and Load commands allow you to try different strategic simulations and even build a "library" of customized war game variations.

A twelve-page instruction manual, which includes a small area map, came with the package. The instructions give you excellent military information and tactical tips, but actual game-playing instructions are merely adequate. Most commands were sufficiently explained, except for the Save and Load commands used to store the current game situation for later play. In restoring a saved game, I inadvertently left the "saved game" disk in the drive after restoring the game, causing the program to crash (become unplayable); this mistake forced me to reboot the game. Step-by-step instructions on saving and restoring games, as well as onscreen prompts, are needed to avoid similar mishaps.

NATO Commander is not for the typical quick thrill, shoot-'em-up youngster. However, if you're seeking a novel, graphic computer war game simulation that's not likely to bore even the accomplished strategist, this game may be your chance to hold the fate of Europe in your own two trembling hands—and possibly even to prevent the outbreak of World War III!

PURSUIT OF THE GRAF SPEE

Strategic Simulations, Inc.
$59.95
48K; II/II+/IIe/IIc

Overall Rating	B-	Medium	*Challenge*
Creativity	C-	B-	*Graphics*
Documentation	D+	B-	*Value for Money*

Pursuit of the Graf Spee is a World War II war game simulation. It offers four levels of difficulty, and you can start the game on one of two dates. The object of the game is to catch and sink the German "Pocket Battleship" Graf Spee by December 25th. It can be played by two people against each other, or by one player versus the computer. When playing the solitaire version of the game, you are in command of the British Navy attempting to corner and destroy the computer-controlled Graf Spee. In the two player mode, you have your choice of who commands the English and who the German forces.

Each player is equipped with a data card. Among other things,this card contains all the strategic information about the ships in your navy. This information includes the hull strengths of the various warships, deck armor, size and strength of any guns, and structural

strength. Each ship has a maximum fuel capacity, and registers a current fuel amount. You have to watch this carefully, since it's rather embarrassing to run out of fuel in the middle of the Atlantic Ocean.

The game takes about two hours to play the "solitaire" version, and at least four hours to complete a two-player game. *Pursuit of the Graf Spee* is marked as an intermediate level game; but once it is learned, a beginner will have just as much fun as the more advanced player. To be able to carry out a good campaign you will need to read the baffling instructions very carefully, then play the game once or twice to get a feel for it (notice how the ships move, and how the computer reacts to certain moves). As you improve, simply increase the difficulty and/or lessen the time period allowed in which to accomplish your mission.

If you think the odds are a little unfair (there are twelve British ships against two German ships), take a closer look. The British must catch the swifter German ships, and the strengths of the juggernauts offset the numbers. In a battle between three British ships and the Graf Spee, for example, the Graf Spee sank two of the three and crippled the third while the Graf Spee suffered only minimal damage.

On the whole, *Pursuit of the Graf Spee* does a creditable job of carrying on the Strategic Simulations' war game tradition. But the game's instructions leave a lot to be desired. They are unclear regarding some options, and assume in places that you already know how to play the game. The documentation is the weakest point of this package.

RAPID DEPLOYMENT FORCE

Strategic Simulations Inc.
$32.00
48K; II+/IIe

Overall Rating	C+	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	C-	B+	*Value for Money*

The year is 1985 and the U.S.S.R. has just invaded the oil-rich land along the Persian Gulf in Saudi Arabia. The U.S. responds by sending its Rapid Deployment Force to the area. The result: *Rapid Deployment Force 1985*, second in the "When Superpowers Collide" modern wargame series. The game closely resembles its predecessors, *Germany 1985* and *Southern Command*, with its hex grid map and multiple commands. The only difference in the commands from those found in *Germany 1985* is the local command, which adds to the excitement of game play.

As the game begins, the Russians have landed with the immediate advantage of steady supplies from the East. The U.S. lands paratroops to harass the Russians until the naval attack force lands. If you choose the Russian side, you must take advantage of your initial superiority to hold the air fields, capture the oil fields, and repel the naval landing by the Americans. On the other hand, if you choose the American side, you must take the airfields in order to receive reinforcements, hold on to the northerly positions to insure a safe beach head, and try to maintain air superiority.

As before, the problem with the game is its difficulty. The multiplicity of commands combined with the unsatisfactory documentation make it nearly impossible to learn, except by trial and error. The documentation assumes too much and only gives a few vague examples of the keystrokes you need for a typical move. The graphics are well done and the scrolling ability allows you to view the entire map to get your bearings.

One major improvement is the price. You don't get the choice of two scenarios as you do in *Germany 1985*, but it's much more reasonable for the price.

SHATTERED ALLIANCE

Strategic Simulations, Inc.
$29.95
48K; II/II+/IIe/IIc

Overall Rating	C+	B	*Challenge*
Creativity	B	C	*Graphics*
Documentation	C	B	*Value for Money*

Shattered Alliance is a tactical war game simulation pitting groups of mythical tribes with varying capabilities against similar opposing forces. Winning is less a matter of destroying opposing forces than it is breaking the opponent's unit and army morale through combinations of encounter results. In many regards, this game is similar to a scaled-down version of SSI's *Operation Apocalypse*. *Shattered Alliance* is in a completely different setting, however, and uses a new move allowance concept, Time Points, as an alternative to incorporating any number of squares in a single move for different types of units.

The Time Point concept is both the strength and weakness of this game. Its strength lies in using this approach to speed up the true game and, perhaps, making for a finer degree of modeling. Its weakness requires the player to react to a near real-time game, demanding faster reflexes, knowledge of the keyboard, and total concentration on the tactics and strategy being used. A greater weakness is that it leads to

one-on-one combats, in which adjacent forces provide neither offensive nor defensive support. Time Points definitely takes considerable getting used to, and according to SSI, will be the basis of a series of programs yet to come.

Shattered Alliance features four scenarios for one or two players; well-done shape tables and text characters, using combat units which are difficult to relate to and differentiate between, especially on a B&W display; two map scales, both of which are adequate but very uninspiring; and a Demo game that is very difficult to follow, even after a thorough study of the documentation, as it seems to go on, and on, and on. The extensive documentation is light on game specifics beyond describing the screen displays and symbology, examples of combat situations, and information that would make the game more playable. It is heavy on mood-setting "background," as well as detailed descriptions of the various move and factor charts and rule Errata, both of which are included in the program and on a separate card.

There is a consistent emphasis on J.R.R. Tolkien-type characters, names, and combat situations, which Bilbo and Frodo fans will find both unsatisfactory and insulting. The game is difficult to learn to play with facility, perhaps more so than *Apocalypse*, which is a better, albeit more expensive, game. Once learned, however, it is perhaps the fastest playing war game yet introduced.

TACTICAL ARMOR COMMAND

Avalon Hill Microcomputer Games
$40.00
48K; II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B+	B	*Value for Money*

Tactical Armor Command places you in command of a WWII armored combat team whose units are selected from German, Russian, American, and British troops. Your opponent is the computer (Major Al Logarithm) or another player; any two nations can fight one another. Over forty tanks, assault guns, field guns, and infantry units have been rated for various factors, such as movement capability, acceleration, gun traverse, and armor thickness. The battlefield employed for all battle scenarios measures 2,000 meters by 1,800 meters and consists largely of open, grass-covered plain interrupted by small wooded tracts. A single game turn, which represents about 30 seconds of real time, proceeds through a search phase when visual sighting of both friendly and enemy units are reported, and a maneuver and fire phase when units move and fire their weapons.

Interestingly, pressing four keys (the cursor Control diamond), determines the direction that vehicles and infantry travel. After the opponents complete both phases of a turn, the computer resolves combat and reports results. After becoming familiar with basic play, a commander can employ special combat tactics, such as over-runs, close assaults and firefights, as well as implement various defensive measures, including the detonation of smoke shells, the placement of mines, and the construction of improved defensive positions.

Because of its fast-paced action, diversity of movement and combat situations, and good graphics, the game is very appealing. Unlike most similar games, even those uninitiated in the art of war games can easily master the procedures and rules of play. I was able to complete most games in fewer than several hours (or they could be saved to disk for subsequent play). The game's worse feature is the failure to inform the commander that pressing the next key will set an armored vehicle in motion. Unfortunately, you must anticipate this in the sequence of prompts. It is maddening to have your tank unexpectedly lurch forward without you at the driving controls. This feature can seriously interfere with tactical play and unduly influence the outcome of the game. Despite this shortcoming, *T.A.C.* is worth owning and can be recommended particularly to the arcade player who wishes to sample the wargame genre.

TIGERS IN THE SNOW

Strategic Simulations, Inc.
$39.95
48K; II/II+/IIe/IIc

Overall Rating	C	Easy	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	C	*Value for Money*

Tigers in the Snow is a Regimental to Divisional level war game simulation of the 1944 Battle of the Bulge. It offers two rather similar scenarios, differing in length and victory conditions; either or both sides may be played by the computer, and one or two players may compete. The familiar SSI hex grid system and Move Point concept are back, somewhat simplifying the learning process. The game features variable weather, supply and fuel conditions, which influence the Move Point allowance of each unit. Happily, there is no need for the opponent to ever "turn away" from the screen.

If you liked Computer Conflict, you will enjoy this game, but don't expect it to compare with the more highly modeled, and more expensive war games from SSI. Similarly, space freaks, interested in something a little different, will enjoy it; don't look for the whimsy of planets, black holes, stars and related galactic saga trappings. Rather, it's a moderately sophisticated, slow-moving, straightforward game that requires some thought and planning.

Historical Reenactments

CARRIER FORCE

Strategic Simulations, Inc.
$59.95
48K

Overall Rating	C	Medium	*Challenge*
Creativity	A	D	*Graphics*
Documentation	C	C	*Value for Money*

Carrier Force permits the armchair naval historian to recreate four of the classic carrier-to-carrier naval engagements of the South Pacific during World War II: the Coral Sea, Midway, the Eastern Solomons, and Santa Cruz. You can play alone or with one other person. In the solitaire mode, the computer very efficiently commands the Japanese fleet. Each player controls the operations and tactics of his task forces and aircraft, directing seaplane searches to locate the enemy. With good reconnaissance, you'll launch the first air strike. The U.S. has the advantage of radar, which lets you scramble your carrier air patrol. Submarine picket encounters, ship-to-ship surface engagements, and air-to-ship attacks can occur, all actions controlled by a variety of parameters including visibility, relative pilot and aircraft qualities, and each ship's speed and armament capability for its main, secondary, and anti-aircraft batteries. Relative wind directions play a significant role in a carrier's air launch capability.

This menu-driven game uses only one rather poor graphic. The documentation explains more than the game displays or makes apparent, to the detriment of your understanding how to play the game. However, the game offers brief but reasonable sets of strategic guidelines for each of the four battles. Generally, the menus and text data displays would benefit significantly from better formatting. The game suffers seriously from a paucity of text (mostly one-liners), especially during the combat phases and combat resolutions phases. Data entry methods are inconsistent, calling for a mixture of input and Get statements and often requiring unnecessary key pushing. Times and wind directions do not always appear when you need them, and the damage resolution display provides information only when a ship is sunk, leaving it to you to search out the specifics during the manually-controlled phases. You may be advised "Torpedoes Approaching Japanese Ships" without learning the target and location. You learn the result only in case of a (rare) hit.

Like many of Strategic Simulation's war games, *Carrier Force* takes a long time to play. Even if you know the precise location of both fleets, the game can take many hours. Unfortunately, you do not have access to an internal running score and cannot terminate the game before it runs the specified time. Nonetheless, *Carrier Force* best simulates the battle of Midway, the turning point of the war, and offers the only simulation of the other three battles. The elements of the modeling remain open to argument on the relative quality of the pilots, aircraft, and bombing accuracy, but the detail will satisfy most war-gamers. It's too bad that the company didn't put a little more effort into the display and formatting techniques.

COMPUTER AMBUSH

Strategic Simulations, Inc.
$59.95
48K; II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Creativity	A	B	*Graphics*
Documentation	A-	B	*Value for Money*

Computer Ambush is a vastly improved version of one of the first Apple war games. As before, the game pits an American and a German infantry squad of up to ten men against each other in a devastated French village during World War II. Five single games (with the computer commanding the German troops), six two-player games, and a free-form scenario are now provided. (The sequence of the original game was 3-3-1.) All the games except for the first single one (NCO Training) prompt you to select the number and deployment of the troops. Strategic Simulations, Inc. makes recommendations for both in all scenarios.

At the beginning of each turn, you are prompted to specify the number of time points (one to 250) for that turn. Each time point is equivalent to 0.1 second of real-time action. A series of orders is given to each squad member; each action requires a specific number of time points to execute. Once both sides have defined their orders, these are executed against a constant time base, permitting simultaneous action to take place. You can control the degree of difficulty by using "unlimited" or "blind" visibility—the latter involving a complex set

It also involves artillery support, reinforcements, optional attacks on each unit by any or all adjacent forces, the probability of independent command actions overriding your orders, and a save game option.

Tigers is one of the faster war games to come along and is only disk interactive between turns. The game speed is also a problem, in that the status displays flash by too rapidly for planning or understanding. The "hold action" commands of *Operation Apocalypse* are sorely missed. Indeed, there are only three keyboard commands other than the direction numbers and Yes or No responses. *Tigers* is not as tightly modeled as some of SSI's other games, making extensive use of the randomizer which leads to a wide range of battle results for a given set of tactics.

As with many SSI games, the documentation is very confusing; be sure to read the "Apple Player's Aid Card" at least twice before even opening the documentation! It is especially poor in defining the meaning and interactions of the various combat commitments that the player is called on to make. *Tigers* has a variety of other aggravating flaws. You are not able to select the sequence in which the units are moved, check the status or location of units, and control the air power when it is available. Symbols to name the historic and game significant towns, for example, could have been easily added.

Compared to *Operation Apocalypse, Tigers in the Snow* is almost as difficult to learn, but is much faster in setup time and response. It is also easier and simpler to play. It is not as versatile or interest-holding as the more expensive *Apocalypse*; however, it is a superior war game to the equally priced *Computer Conflict*. As a minimum, the simplicity of play permits war gamers to enjoy and concentrate on the tactical planning associated with this simulation.

VC

Avalon Hill Microcomputer Games
$25.00
48K; II/II+/IIe/IIc

Overall Rating	C	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C	*Value for Money*

A Hi-Res war game of the same genre as Avalon Hill's previous war games, *VC* adds Hi-Res shape table graphics, some sound, and animation, but it's still a random, number-happy game—far from a tactical simulation, as it contends. However, as a war game, it does capture some of the frustrations of the Vietnamese war.

You command ten Vietnamese Republic Army units (ARVNs), a U.S. helicopter gunship, and a U.S. artillery unit. You find yourself in the middle of a thirteen by thirteen element map of Vietnamese straw hat shapes, initially representing neutral civilians, Viet Cong units, or North Vietnamese Army units. While you may face as few as four enemy units at the outset, political recruitment can rapidly swell their ranks. ARVN forces can likewise make friends and allies among the civilians by moving through them; a blue straw hat shape with a small "F" dangling on it marks friendlies. A turn consists of the opportunity to move one piece and, optionally, fire your artillery. The game ends abruptly, either when half of the civilian population has been killed (you lose) or when you have successfully dealt with the baddies. Since games go quickly, often in as few as ten moves, you do not need a save game feature. You don't get one, either. The speed of play is excellent, due in part to the original Applesoft program having been compiled on the otherwise unprotected disk with the TASC compiler by Microsoft.

Contrary to your initial reactions, you can beat *VC* (even on the fourth and highest level of difficulty), but it takes strategy and a lot of luck. Watch the screen carefully after your initial move. The hats may change, the resultant flashes permitting you to deduce where the Viet Cong hide among the civilians. While this lets you use your artillery, be sure that you guess right. Should you guess wrong and shell neutral civilians, you'll lose most of your carefully cultivated allies and promote Viet Cong successes. *VC will hold your interest—at least until you learn to beat it. Beyond that, however, there isn't much to it.*

50 MISSION CRUSH

Strategic Simulations, Inc.
$39.95
48K; II/II+/IIe/III, Franklin Ace

Overall Rating	B	Med/Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	A	B	*Value for Money*

Have you ever wanted to be a bomber pilot? You probably won't anymore after playing *50 Mission Crush*! Your mission: to bomb the target. Your goal: to survive fifty missions, and if you do survive, you get to wear the coveted "50 Mission Crush," a slightly out of uniform cap that indicates how battered and beaten bomber crews get.

This is a game with a terrific historical background, and an edge of frustrating realism to its play elements.

For instance, your worst enemy is flak from the ground; you can do nothing about it but hope it misses the vital elements of your plane and crew. A whole mission can be scrapped—in fact, you and your crew can be killed by a random hit from a piece of flak. But there is no way to avoid it. Each city you bomb will have anti-aircraft batteries, and in order to deliver your payload, you must become vulnerable to their fire.

The other enemies are the fighters (or bandits as they're called in the game), who bloodthirstily seek you. If you are in formation with your bomber group, fighters are less of a problem, but if you are on your own and out of formation, you are especially vulnerable to bandit attacks.

There's a lot to remember while playing this video adventure. Not as much, certainly, as in a real bomber situation, but enough to cause me to keep the manual handy at all times. First you must name each member of your crew. Nine other crew members are present on your B-17, and they, like you, will improve their performance as they gain experience.

After the crew is named, you are assigned a mission and given a bomber to fly. You then determine the fuel load you want to take. The amount of fuel you take along determines how full a bomb load you will be able to carry, and the bomb load affects your score. You can fly overloaded, thus increasing your bomb load, but there are definite risks to this strategy. It's important to check the map (on the back of the manual) for the location of the target and the approximate number of gallons of fuel you need to complete the mission. Almost everything effects your fuel consumption so you must leave a comfortable margin for error.

With these requirements out of the way, you take off. In each turn, you can climb or drive 5000 feet, display the map, and fly in a chosen direction. The best strategy is to achieve the assigned mission altitude as fast as possible, thus gaining the protection of the formation. Clouds and fog can help hide your plane from enemies, both in the sky and on the ground, but fog and cloud conditions change from turn to turn, so you can never ever take them for granted. Still, adept use of the cloud cover may save your craft from devastating damage.

Once over your target, though, you must dive below the cloud cover to deliver your load of bombs. This inevitably leaves you open to the flak attack for a couple of turns. I cannot emphasize too strongly how helpless one feels watching the flak surround one's ship randomly destroying equipment and lives. I'm glad it's only a simulation! But be aware that *50 Mission Crush* is absolutely *not* a game of skill, but rather one of strategy and *luck*. To complete fifty missions, you should cling to your trusty rabbit's foot, four-leaf clover, and any other lucky charms you can dig up.

Once the bombs are away, you must still make it back to your mission headquarters in Thurleigh, England. You may survive if the plane is ditched or if it crashes, but it's almost certain that you will lose some crew members, as well as some points. Consequently, you'll have to make it back to base through more bandit attacks and flak from the ground.

During game play, you must keep many other factors in mind: frostbite, fire (in and out of the plane), incapacitated gunners, and so on. You must be able to calmly deal with emergencies; after all, you're the brave pilot. You must even be able to decide if and when a mission should be aborted.

50 Mission Crush is not a game for everyone, but will appeal the most to those who would like to share a little of the excitement, frustration, and daring of World War II B-17 pilots. The game certainly has an addictive flavor. Though the graphics are stationary and basically simple, they add to the game's enjoyment. Essentially, this is a game of the imagination. It's not the greatest game I've ever played, but it does have a certain appeal. The manual gives you a lot of historical and technical detail, even providing a historical document at the end that makes for quite interesting reading.

I especially like the picture on the front of the manual (also on the front of the packaging) which just about sums it all up. It depicts a Bogie-like pilot, cigar in mouth, speaking to his obviously frightened co-pilot as flak fills the sky, cashing through the front windshield. An enemy fighter is heading toward them, wing guns blasting furiously. "Why can't every mission be this easy?" the intrepid pilot blithely asks. Hmm ....

Simulations

General

CARTELS & CUTTHROATS

Strategic Simulations, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	A	B+	*Value for Money*

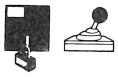
A business management simulation game, *Cartels & Cutthroats* suits high school and college business administration courses. You can play with up to six players or alone, with the other five controlled by the computer. Each player manages his or her own company. Each, as company president, makes decisions on eight aspects of company operations: units of production, units of raw material to purchase, selling price, advertising and research costs, new loans, and whether to build new factories, plus possible wage strikes, availability of new loans at better interest rates, time-saving production costs, and so forth. Numerous economic and company reports help you make decisions. You can view them on the screen, all players together or individually, or send them to a line printer for classroom or homework distribution. You can also save the game at the end of any quarter.

The summary news wire lists the gross national product and consumer price index in addition to the number of units sold, price, and total revenues for each company in the industry. Each player also receives a profit and loss statement; a balance sheet; sales reports covering sales, performance, and consumer preferences; a production report explaining costs and inventory; and a market summary comparing all of the companies' sales. A year-end annual report enables you to ascertain your success or failure for each business quarter.

You can choose from numerous business scenarios, ranging from beginning to advanced. You can choose a business climate with relatively stable economic savings, inflation, and raw material costs, or one where prices swing dramatically. You can choose a product type ranging from necessities through mixed goods to luxury goods. You can also specify the levels of chance and the level of difficulty. A beginner can thus play against advanced players without penalty, actually getting hints to improve his or her profits.

This excellent game develops business strategy by removing all the drudgery of calculations. It teaches through immediate feedback, showing which policies succeed. The bottom line is market share and net profit. A systems simulation expert and the holder of a Masters in Business Administration designed this game. The model includes the relationships between economic environment, production management, and market forces. It includes the laws of supply and demand, price elasticity, market price equilibrium, advertising and product differentiation and their effect on sales, inflation, the GNP, CPI, and disposable income.

Extensive documentation presents *Cartels & Cutthroats* exceptionally well. The documentation also serves as a primer for business theory and is worth reading as a solid base for making your own decisions during the game. All of the readable and well formatted reports appear in a pleasing font on the Hi-Res screen. In all, an excellent game.



EPIDEMIC!

Strategic Simulations, Inc.
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C-	*Value for Money*

This is certainly the year of the medical game as Strategic Simulations releases a strategy oriented game in which a swarm of deadly meteorites infected with a deadly virus are pelting the Earth. You assume the role of director of the Center for Disease Control where you are in charge of the forces battling the spread of the virulent disease.

During the first phase you must size up the path of the incoming meteor and decide if a rocket should be launched against it. Since you only have three options in any one turn, you can't just shoot down every meteor. They will eventually overwhelm you. Besides, many of the meteors impact harmlessly over water.

The second phase gives you a chance to inspect the fourteen world areas in detail and administer one of twelve remedies. The arsenal of curative methods available includes interferon, vaccine, X-rays, gamma globulin, gene slice, martial law, and clean suits. Each is effective over different periods of time and at different rates. While none will cure the disease completely or immediately, the object is to keep the disease static. This status prevents the disease from reaching the more contagious airborne, or "pneumonic" level. The area can't be recontaminated by another meteor strike, and it keeps the virus from spreading to adjoining areas. If you can surround the seriously infected areas by making them static, then you can contain the spread.

If an infected area becomes "pneumonic," then you need to resort to other control methods. You can use cloud seeding, microwaves, aerial fire storms, and in dire emergencies, killer satellites. If things become totally out of hand, you can decimate an entire area by nuclear bomb. Since your final score is based on the number of dead, this is a drastic method and to be used only as a last resort.

The game lasts between fifteen and thirty turns depending on level of play. In the harder levels the disease spreads faster and you have only two options instead of three. Your final score is given between 0 and 1,000 points. There is a save-game option.

Epidemic is an interesting game on a strategic level. It is not played in real-time, so there is ample opportunity to think out strategy. The game has some graphics, mostly maps of the world showing meteor positions before they enter the atmosphere, and one showing the status of the world's contaminated areas. The rest of the game features charts. Overall, the game is entertaining and offers something completely different from the rest of Strategic Simulations' war games.

FORTRESS

Strategic Simulations, Inc.
$34.95
48K; II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Creativity	B	C	*Graphics*
Documentation	B	B-	*Value for Money*

This two-player game of strategy is simple in concept, has few rules, is easy to learn, and requires little time to play—games often last less than ten minutes. You occupy territory and lay siege to your opponent's territory. You and your opponent (human or computer) take alternate turns to build fortresses, thus dominating the area immediately surrounding each one.

You play the game on a six-by-six grid. The players issue commands via either joystick or keyboard. You maneuver a large, blinking cursor about the grid. Each player elects to build or fortify a fortress by pressing the space bar or joystick button. These fortresses exert zones of control indicated by colored flags extending out from the four corners of each. An opponent's adjacent fortress of equal strength effectively cancels out control of that square. However, if you fortify yours, it once again dominates the adjacent square. With territorial possession based on strength, adjacent friendly fortresses contribute to your control or ownership of territory. You can attack isolated enemy fortresses, place them under siege, and defeat or remove them from the board. You need only outnumber your opponent's fortress to do this. Each game normally lasts twenty-one moves, but you can adjust this to suit yourself. Long games tend to lose momentum and bog down in sieges, while short games rarely achieve full development.

The computer keeps track of the score, indicating which player controls which squares by use of colored flags. Fortresses under siege and in danger show their state by raising their drawbridges. If you can't think of a good next move, you can query the computer—it has a "kibitz" command. The game is unique in its use of artificial intelligence, teaching the computer opponent to play the game. Although the game comes with a choice of five preprogrammed computer opponents, each with its own game style, you can train others based on your own game strategy. In effect, they learn from their mistakes. Even the preprogrammed opponents benefit from extra game time by playing against a variety of human adversaries. They update their disk file with the "knowledge" they gain.

The instruction book discusses the general theory and teaching techniques needed to train a computer opponent. You teach each strategy step-by-step in short three to seven move games. When you have completely taught a computer player, it can play against other computer opponents in tournament style games. Despite the apparent simplicity of *Fortress*, the game is unique and complex, offering considerable challenge, while its artificial intelligence routines offer endless possibilities.

FREE TRADER

Microcomputer Games
$25.00
48K; II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Documentation	B	B-	*Creativity*
Value for Money	B	C	*Graphics*

"You (sic) out of energy—game is over. Passing pirates have stolen your cargo and set your body adrift in deep space . . ."

I thought I'd start out on a cheery note. As you can see, the life (or death) of a space trader can be difficult. Not only do you have to act the merchant—buying low, selling high, collecting early, paying late—but you must also be a warrior, fighting off the enemy Thoths whenever they appear. As if that were not enough, you have to be ever alert for the rip-off space pirates, and, whatever you do, don't run out of fuel. How do you get more fuel? You buy it! and fuel is not always cheap, so you had better be a good trader or you'll soon be a dead one.

On the plus side, you start out with some money; some fuel for sublight travel and some for hyuperspacing; some lasers and some rifter pods for weaponry. The difficulty is in knowing your galaxy. You have to know where to buy and where to sell; it is especially necessary to know where fuel and weapons are sold. Like any good trader, you have to keep track of prices around the galaxy or you'll end up buying high and selling low.

In fact, there are three different galaxies to explore in separate games, so you can learn one, explore and master it, then move on the another. There are fourteen different types of planets, and each planet imports three products and exports three others. With experience and practice, you'll learn to recognize these planets as you move from star system to star system.

Your manual is adequate, but it was written for both Atari and Apple versions, so you have to read around the Atari information. That's because the disk is double-sided, with one version on each side. If you have both machines, you're in luck. Unfortunately for the Apple user, the Apple version does not use the joystick. It would be a much better game if it did. To move you have to input the trajectory on a 360 degree compass, then the amount of fuel to use (from one to nine cells). This makes for a very slow game with lots of keyboard input. It would be much faster using a joystick. Additionally, firing weapons against the Thoths would be much easier with the joystick.

I stumbled onto a nice, but totally undocumented feature: an editor for editing planet information and other things. One time after I had died, I catalogued the disk, and low and behold, I discovered some *Applesoft* files written specifically for the purpose of modifying the game parameters. So you can cusomize things to some degree. There are no instructions, however, so be careful! Since the disk is not copy-protected, you might want to experiment with a backup copy.

Free Trader is a fairly decent game, but it is hampered by old technology. Since it's written in *Applesoft* it's slow, and it accesses the disk almost every time you do something. It does start to get interesting once you begin to know the galaxy, and it could hook you into playing over and over to master its subtleties. It didn't hook me, but it might hook you. It's an average game that could be above average if it were faster and had joystick control. Still, the price is reasonable, so if you want to be a space explorer with a capitalist bent, check out *Free Trader*.

GEOPOLITIQUE 1990

Strategic Simulations, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	C+	C+	*Value for Money*

Geopolitique 1990 resembles a chess game, being a political simulation in which you take the part of the President of the United States of America and the computer takes the part of the Soviet Union. You struggle against each other to achieve economic strength in a non-nuclear war. You negotiate economic, political, and military agreements with computer-controlled neutral countries, and manage the domestic economy by allocating your industrial base to production of raw materials and finished goods. At the same time, you may find it necessary to build a military force capable of winning a conventional war. You cannot take this difficult simulation lightly; it challenges your knowledge of world politics and your ability to react appropriately.

This mostly text game offers reports of your status and that of the Soviet Union, including a Hi-Res graphics display showing controlled areas. Students might enjoy working as a team to learn actions and reactions in world politics, and thus improve their understanding of the subject; but for recreation, you may find the game rather heavy unless you are interested in world politics as a hobby. Due to the complexity of the game, you must study the complete manual to play. The disk is protected and has no backup.

PRESIDENT ELECT

Strategic Simulations, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	D	Easy	*Challenge*
Creativity	D	D	*Graphics*
Documentation	B	D	*Value for Money*

This political simulation game, like a true politician, makes great promises and is agonizingly slow to deliver anything. It has bells, whistles, and options galore. One to three people play, managing up to three presidential candidates in the final nine weeks before the national election. You can choose from six historical election years, using actual socio-economic conditions, or use the same six years under non-historical conditions. You can use real candidates and their beliefs, such as Goldwater against Reagan or LBJ against Carter, mix and match them as you will, create your own candidate and run him as a Republican, Democrat, or Independent against whomever you wish, or even create your own setup and let the Apple manage all the campaigns. The present 1980 demo game takes eight and a half minutes for each of the nine weeks.

Once you've gotten all of these neat preliminaries out of the way, it's on into a dull and repetitious set of nine turns (weeks). A turn consists of simply allocating the available campaign funds into campaigning on a national, regional, or specific state basis. You can also make campaign trips, at home or abroad, or debate with your opponent (included in separate budget categories). Actually playing is very easy because of extensive prompting and good error trapping. Just specify the amount to spend for each element. If you choose to debate, you specify what percentage of your argument or rebuttal period to spend on different categories, such as addressing the issue, criticizing your opponent, being indignant, or simply killing time. No, you don't even need to read the questions, despite their relevance.

After each turn (at which point, mercifully, you can save the game), the only graphics in this program appear—a rather poor map of the United States. After only seventy seconds, the map is color filled!, The cartographic display shows states committed, leaning toward, or too close to call for each candidate. Then it's back to parceling out more money. Believe it or not, you can even watch the election results pour in—in real time. It takes over four hours. This section also shows the ultra-slow map whenever another state commits itself to a candidate. Alternatively, you speed up the time to two faster modes, one of which proceeds to all of the final returns and shows only one map.

Although nicely modeled and providing a fine degree of simulation, *President Elect* has trouble keeping your interest. It's dull. However, you could put it to good use as a youngster's primer in budgeting, with the secondary benefit of teaching them what it takes to get elected president, especially the financial expenditure involved. As for me, no thanks.

RENDEZVOUS Version 1.1

Edu-Ware
$39.95
(Ages 13-Adult)
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	Hard	*Medium*
Creativity	B	B	*Graphics*
Documentation	A	A	*Value for Money*

Rendezvous Version 1.1 is a Hi-Res simulation of the docking of a Space Shuttle with an earth-orbiting space station. It is a more graphic and complex treatment of *Saturn Navigator's* somewhat more educational program. Four separate and distinct phases are required to successfully complete the mission: boost phase, orbital rendezvous, approach, and docking. Piloting proficiency and time are further challenges; the less time, the higher your rank (from Swab to Fleet Admiral). An earlier version, 1.0, is identical in graphics and play, but does not have the extensively updated tutorial and documentation.

When the criteria have been met, each phase links into the next, often with shocking results. The phases become progressively more difficult, as there is less room for error in the latter phases. This is not to say that the first phases are a snap. Proper energy management is a key element. You can achieve at least a partial earth orbit without using any of your third stage energy; but if you use very much, you may not have enough for docking maneuvers.

The trickiest parts of *Rendezvous* are "real world" (or perhaps "real space" would be a better term). The concepts of space flight take some getting used to. For example, to catch up to a spacecraft, you must be in a lower orbit; to get into a lower orbit you need to slow down. Thus, to go faster, you have to slow down! Also, if adding up-and-down velocities to the front-back and left-right perspective of ground-bound travellers isn't too mind boggling, try adding the three altitude vectors of roll, pitch, and yaw, and things start to get tough. In space, there is nothing to prevent you from charging straight down the road sideways, upside down, or spinning like a top.

Rendezvous does reasonably well in 6-D controllability, and a 3-D representation on a 2-D video screen,

although the optical illusions can be troublesome. All six axes may be joystick or keyboard controlled (12 keys, or 1 joystick). The keyboard isn't as sporty, but provides better incremental control. A joystick is easier on the brain and more realistic, but much more disaster prone. Don't despair, for in each of the four phases, ten saved-game positions may be saved to the program disk. On recalling a game, only the positions for the current phase are displayed. Unfortunately, there is no delete capability until you fill all ten positions. To avoid total chaos, keep notes on the status of each game when it is first saved.

The game may be entered at the start of any phase, either from a saved position or from a user-defined set of initial conditions. "Easy" setups are postulated in the documentation for getting the feel of the game. The game will also return you to your initial position in your present phase without having to save it. If you intend to dock successfully, then heed well: keep cool, don't use high rates, and above all, don't make like a jet-jockey and maneuver with rates in more than one axis at a time.

SEVEN CITIES OF GOLD

Electronic Arts
$40.00
48K; II/II+/IIe/IIc

Overall Rating	A+	Medium	*Challenge*
Documentation	B	A	*Creativity*
Value for Money	A	B	*Graphics*

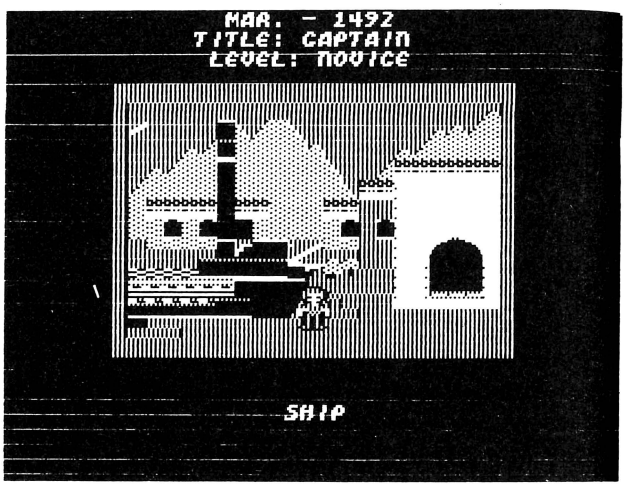
In *Seven Cities of Gold* you can be a benign explorer or a ruthless conquistador exploring the New World. After outfitting a fleet of ships and hiring a crew, you set sail in search of land, riches, and fame.

The game, historically correct, begins in 1492 with your audience to the Spanish king. Once you have obtained funds from him, you stop at the outfitter to purchase ships, food, and trade goods, and hire crews. Finally, you embark on your perilous voyage to the unknown.

If you know your geography, you'll have an advantage, at least with the accurate New World portrayed on the map disk. Of course, you could create an entirely new world and save it to another map disk. Either way, the game offers considerable challenge, since you must navigate the seas by latitude and the passage of time. Your joystick-controlled ship sails within a small scrolling window that limits your long-range sight to ten miles, much like a ship at sea with a man stationed in the crow's nest. Storms delay you, blow you far off course, or damage your ships and crews. With a limited food supply, you must reach the New World quickly.

When you sight land, you have a choice of sailing along the coast, automatically mapping as you go, or finding a safe anchorage to start exploring. You must decide how large to make your landing party, and how much food and trade goods they should carry. Alternatively, you could establish forts or missions near your landing site.

You'll encounter rivers, lakes, forests, plains, and even mountains as you explore. Your traveling speed varies, and rough terrain always costs you additional food. You'll find many native villages, and even small cities, particularly near rivers. Different symbols on the scrolling map indicate size variations. When you enter a city or village, your view zooms in to show the details.



When you enter a native village, you can cautiously offer gifts to their chief, or even trade with him, assuming you brought enough gifts. Don't make any sudden moves as they crowd around you: you can easily injure, or even kill them. You can deliberately engage in wholesale slaughter, like Pisarro did with the Incas. While the latter may seem easiest (despite moderate losses), word quickly spreads throughout the region, and other villages prepare for your arrival. You may even be ambushed in the countryside as you head back to your ship. Conquered villages' wealth is yours if you have enough men and native bearers to transport it back to the fleet. If you leave several men behind, they can establish a fort. Likewise, if you trade in peace, you may leave a few men behind to establish a mission.

A peaceful approach is often best, especially if you intend to learn the locations of the natives' gold mines. Of course, you can set out on long term explorations to find them yourself, but food is always a problem. You have to rely on large numbers of unreliable native bearers who will desert at the slightest provocation. Food is especially scarce in winter, and, if you get lost, starvation almost absolute. Once you've lost your land

expedition from battle or attrition, you lose the entire sea expedition, and any information and maps you gathered since setting sail from Spain.

Your goal: bring your fleet back to Spain brimming with treasure. When you arrive, the grateful Queen grants you honors and title, and helps you assemble an even greater fleet for your next voyage. The Pub displays your maps for posterity, and you see a complete map of all that you've discovered.

Seven Cities of Gold is extraordinarily well conceived, and superbly executed. While the graphics are merely adequate throughout the game (actually, the home port graphics are superb), game play is involving. Time flies when you begin exploring a brand new world. You can even save your game to return to it later—your current position is saved to your map disk. Higher difficulty levels present you with more populous native villages that are harder to deal with. Time also passes quicker, and more random events take place (like storms and the possibility of the crew sailing home without you). In sum, the game is great. It is very engrossing, and once you start playing it you can get hooked for a very long time.

THREE MILE ISLAND (Special Edition)

Muse Software
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	Medium	*Challenge*
Creativity	B-	C+	*Graphics*
Documentation	A	B+	*Value for Money*

This complex game simulates a nuclear power plant that you must run both safely and economically in a speeded-up, real time operation. As with any simulation, problems occur and need fixing. Equipment in normal operation either breaks down or needs to be scheduled for repair. You must switch the backup systems on-line. Inability to handle crises due to your mistakes in procedure can easily lead to radiation leaks or even meltdown.

The game has many Lo-Res views of the system, showing news of the plan, on-off status of valves and pumps, coolant levels and flow in all pipes and systems, and internal radiation leaks. This updated version, done entirely in Machine language, switches views instantaneously. Displays also include status of operating pressures and temperatures, electrical demand and expected changes, plus operating profit and loss statements. Beginners can stop the real time clock if they need more time to respond to system changes like increased electrical demand.

This demanding game requires a technical mind to understand. The thorough documentation explains clearly how an atomic power plant operates. *Three Mile Island* has a demo mode and a fast mode that allows you to view a meltdown from start to finish. It's one of the first and best simulations done on the Apple.

Flight Simulators

AIRSIM-1 FLIGHT SIMULATOR

Mind Systems Corporation
$24.95
48K; Apple II/II+/IIe/IIc

Overall Rating	D	Medium	*Challenge*
Creativity	B+	D	*Graphics*
Documentation	A-	C-	*Value for Money*

For anyone who would like the opportunity to fly the New York/New England crash corridor without leaving the safety and comfort of your living room chair, the *AirSim-1 Flight Simulator* may be your ticket. The author spent a great deal of time making the documentation very clear, but unfortunately failed to provide any visual references for most of the area you are meant to fly in other than the horizon. In addition, as the manual points out, you are free to fly through any obstacles that do not appeal to you.

Control is the greatest deficiency of this program. You are meant to be able to use either a self-centering joystick or paddles. The joystick was hopeless. I found that the only way to keep the plane almost stable was to use paddles. (Rumor has it that you might be able to control the simulator better if you have paddles which you can trim.) With paddles, you can at least set the roll axis at neutral, and control the climb and descent rate until you are airborne. Most disheartening is the fact that the screen is only updated once a second, so control inputs are a very delicate matter indeed. The most critical input seemed to be the turn or roll. I found myself repeatedly spinning the plane into the ground after making only minor course adjustments.

When you exceed one of the flight parameters considered acceptable in the program, you are sent out of control and cannot recover. You must wait for the crash or press Reset. I was highly amused watching the altimeter and climb indicator alternate between almost vertical climbs and steep descents, the compass spin wildly through "1,250" degrees (that's right, one thousand two hundred and fifty degrees), and the horizon situation indicator display almost back-to-back ninety degree turns. But apart from this sort of entertainment value, the program seems to be a good idea that somehow took a nosedive.

F-15 STRIKE EAGLE

Microprose
$39.95
64K; IIe/IIc

Overall Rating	A	Med/Hard	*Challenge*
Documentation	A-	A-	*Creativity*
Value for Money	A	B+	*Graphics*

Microprose has improved their line of aerial combat games over the years and now they top it with an exciting simulation of America's top-of-the-line $20,000,000 fighter aircraft, the F-15 Strike Eagle. When you jump into the cockpit (behind the combined joystick and keyboard +controls) you feel like you're really airborne. The sky tilts with the slightest twitch of the joystick, and the gridded ground rushes past as you approach a top speed of Mach 2.5.

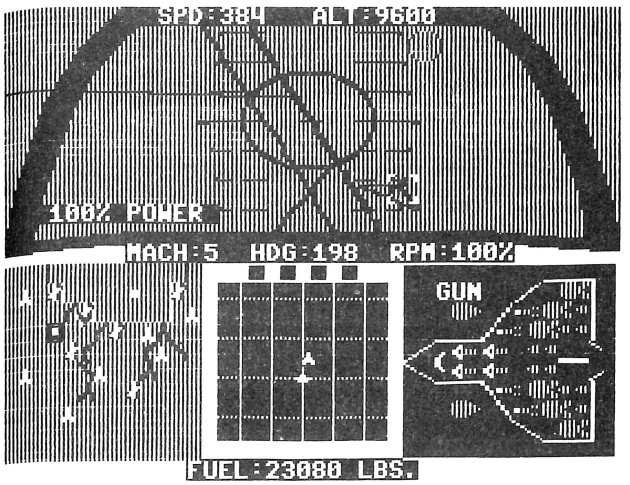
The playing screen is divided horizontally in half. The top cockpit view is the HUD (Heads Up Display). The HUD projects gun and bomb aiming points, pitch lines, flashing steering cues, and messages on the cockpit window. It also displays target indicators which show where an enemy plane or missile, which are often too small to see, is going to appear. The space bar toggles this view from forward to aft.

The bottom half is divided into three sections. It shows the mission map on the left, the bottom view radar in the center, and the outline of the plane on the right. The latter shows which weapon you selected and the number of missiles and bombs remaining. The radar scanner can shift between long, medium, and short range. This is extremely useful for finding airborne targets and evading enemy missiles.

The mission map has an interesting feature that helps you navigate to your target nearly effortlessly. You use the arrow keys to move a rectangular cursor over your intended target. The HUD displays flashing NAV letters in sequence one at a time. You need only turn the plane toward those letters and align them in your crosshair and you'll be guided to your target.

The goal in each of your seven missions is to rack up points by destroying planes and ground targets. These are usually airfields and SAM sites, although it varies. Scenarios include Libya, Egypt during the 1973 war, Hanoi, Syria, the Persian Gulf, and Iraq's nuclear reactor. Missions terminate after all your targets are destroyed or when you run out of fuel. Fuel can be a

problem, especially if you use your afterburners often to evade fire, but you can vary your throttle with the number keys to conserve fuel. The higher you go on the four skill levels, the more skilled and accurate the enemy becomes.



Fortunately, your plane is equipped with ECM (Electronic Counter-Measures) to help you evade SAM missiles. While it is impossible to know if incoming missiles are heat-seeking or radar-guided, you can also launch flares to confuse them. Enemy planes are almost sitting ducks to your guided missiles if you can keep them in front of you, but they could mean your quick demise if one gets on your tail. I hope you can master some good defensive maneuvers to elude him. Bombing is the hardest part of the game. Although activating a bomb puts up an Air to Ground Rectile on the HUD, getting it inside the target triangle is another story. The ground target is annoyingly small and passes quickly unless you are flying slow and low, a position where you are most likely to get shot down by enemy fire. You will lose dozens of planes before you really get the hang of it. Learning to fly the plane isn't difficult, as long as you remember to maintain your altitude so that doing a loop doesn't ram your nose into the ground.

In all, *F-15 Strike Eagle* is an exciting though stress inducing simulation. The graphics are fine and colorful, especially in the displays, but targets, which are indicated by a bunch of vectors rather than solid, are hard to see. The game requries strategy, good reflexes and skill. Definitely a winning combination for an arcade game.

FLIGHT SIMULATOR II

subLOGIC Communications Corporation
$49.95
48K (64K optional)

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Graphics*
Documentation	A	A	*Value for Money*

Flight Simulator II is a vastly improved version of Bruce Artwick's original 1979 three-dimensional flight simulator. The major improvements include more accurate flight equations, color terrain with a slightly faster framing rate, a full instrument panel with artificial horizon and navigational radios, variable weather conditions, rudder control added to the ailerons for coordinated turns, variable view selectors, and actual flight terrain around airports in Boston, New York, Chicago, Los Angeles, and Seattle.

The program simulates the performance characteristics of a single engine Piper Cherokee Archer II PA-28-181 airplane, with a top speed of 125 miles per hour. The simulation almost qualifies as an actual flight simulator if only you could substitute a control yoke and rudder pedals for the Apple's keyboard or joystick control system. Surprisingly enough, the default keyboard control proves easier to use than a joystick. If you use a joystick, either make sure it's not self-centering, or disengage the springs. Pilots will find flaws in the "feel" of the controls and may experience some initial frustration in learning the proper keystrokes to control the simulator, with separate aileron, elevator, rudder, throttle, elevator trim, and flap controls. The default entry mode links aileron and rudder controls to guarantee coordinated turns (so the plane won't slip sideways while banking). However, you can uncouple the rudder and aileron controls (useful during landings).

The upper portion of the screen shows a three-dimensional color view of the terrain. You can adjust the view for the right, left, rear, or bottom views. The bottom looks virtually like a road map; you can zoom in and out on it. While you may have trouble discerning terrain detail from the flat perspective of low altitude flying, the view improves radically from altitudes of one thousand feet and up. The lower portion of the screen shows the instrument panel. Rather complete, it features airspeed and altitude indicators, bank indicator, Omni Bearing Indicator (with glidescope), slip indicator, vertical speed indicator, and heading indicators. Further additions provide the "pilot" with a realistic set of instruments and controls: navigational radios, a transponder, fuel, oil pressure and temperature gauges, tachometer, gear up/down, lights, carburetor heat, and magneto indicators.

Skilled pilots can adjust the dynamics of the craft to achieve the most realistic conditions, while novices can

leave the settings alone. The reality mode requires you to start the plane with the magneto switch and starter, then trim the plane properly. You must keep the plane on the runway or risk getting stuck in the mud. A set of default modes include night or dusk flying and moderate or bad weather flying conditions. Saturday afternoon pilots or arcade game enthusiasts will appreciate just how easy it is to take off and fly the plane in the coordinated turn mode (if you do not bank the plane too steeply). The plane is not an arcade fighter. It flies slowly and crashes easily. You may find it particularly difficult to land safely. Remember, the plane operates in the reality mode where you don't get a second chance.

Flight Simulator II possesses one interesting feature: the ability to rapidly position the airplane at any desired location, altitude, pitch, and heading, either through the use of a system called "slewing" or through direct entry of parameters in the editor mode. Slewing helps you get the aircraft in position to practice instrument landings, and you can save the values to disk for later use. At one point I shifted from Meigs Field in Chicago (the default airport) to Santa Monica Airport in California, entering the coordinates myself. To my surprise, I found the airport runway exactly correct.

A game mode called "World War I Ace" involves bombing runs and dog fights with computer-controlled enemy planes. A radar set replaces the radios to indicate the position and relative height of the enemy. You need a color monitor here because different colors represent different heights. The space bar acts as a machine gun, but since the planes appear as dots and the present version of the simulator lacks tracer bullets, you will have trouble ascertaining the results. When you get hit (usually from the rear), your plane's performance degrades until you crash. You score points by bombing fuel depots and factories.

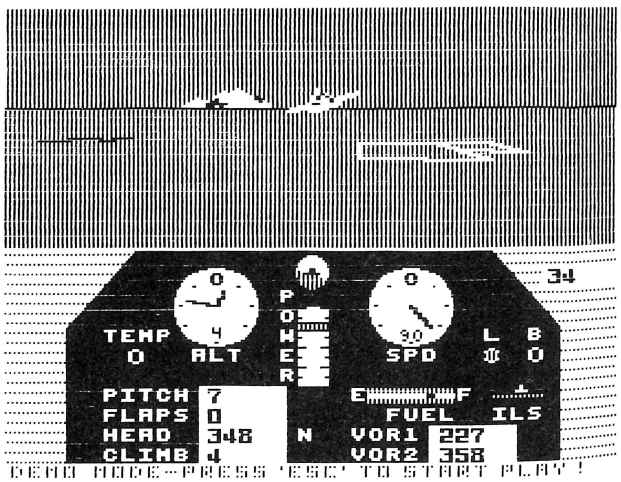
The program comes with superb documentation. Navigational charts accompany an easy-to-read eighty-eight page manual. The detailed manual explains everything you need to know about flying and navigating an airplane. This outstanding piece of software is visually detailed and realistic in every aspect. It allows computer owners to become Sunday pilots in the relative safety of their own homes. I highly recommend *Flight Simulator II* for entertainment, but it is more than a game. Any would-be pilot will find it an excellent training aid.

SOLO FLIGHT

MicroProse Software
$34.95
48K; II/II+/IIe/IIc

Overall Rating	B+	Hard	*Challenge*
Documentation	B+	A	*Creativity*
Value for Money	B+	A	*Graphics*

Solo Flight offers an exciting chance to pilot your own airplane and learn all the basics of instrument flying without leaving the comfort of your living room chair. You can crash the plane without injury and begin flying again after pressing just a few keys. A real-time flight simulator, it employs excellent three-dimensional graphics and aircraft sound effects to mimic takeoffs, landings, and cross country navigation under both visual and instrument flight rules. You may fly to any one of twenty-one different airports in three distinct areas of the continental United States. Options include touch and go, visual and instrument flying, full cockpit instrumentation, dual VOR navigation radios, an instrument landing system (ILS), multiple air navigation maps, four difficulty levels, and emergency procedure practice. As an added bonus, *Solo Flight* includes a Mail Delivery game in which you try to deliver as much mail as possible in the shortest period of time. The program awards points after each landing, based on your performance during the flight.



Let's take a look at what you'll see on the screen. In the visual mode, the top half of the flight screen shows your plane and the highlights of the local terrain (updated as you fly). At low altitudes, you can see your shadow on the ground. Airports are black, VOR towers and mountains white, and farms gray. If you fly above the clouds, you can't see objects on the ground. Normally you look ahead, but you can also look to both sides and behind the plane by pressing the cursor keys. The bottom half of the screen shows the instrument panel with the altimeter, the airspeed indicator, an

artificial horizon/altitude indicator, throttle, pitch indicator, flaps indicator, direction compass, vertical velocity indicator, fuel gauge, temperature light, landing gear, brake lights, the two VOR indicators, the ILS landing approach guidance system, and a clock that tells you the elapsed time of your flight in seconds. The program updates all instrument readings constantly as you fly.

The Mail Pilot game tests your flying skills and judgement. You must deliver five bags of mail to their destinations in the least amount of time. Using the function keys described in the flight menu, you select the quantity of mail and fuel that you take on board at each airport. If you don't make a selection, the program enters the demo mode. When in this mode, you can regain control of the aircraft at any time just by moving the joystick. At the more advanced levels, your plane tends to develop instrument and mechanical failures. Landing at any airport allows you to repair the equipment and continue on your way.

One of the better flight simulations on the market today, *Solo Flight* comes with well written documentation that makes learning the program relatively easy even for a beginner. I took several hours of flying lessons many years ago and found that I could fly and land the plane after only a few trial flights. However, the Instrument Flight Rules section targets advanced flying students with many hours of experience. I strongly recommend *Solo Flight* for anyone interested in flying, from the new student to the professional airline pilot who just wants to have a little fun at home. Who knows? You may have to take over the controls sometime, just like in the disaster movies!

Financial

BARON

Blue Chip
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A	B+	*Graphics*
Documentation	A	B	*Value for Money*

Like its companion programs, *Tycoon* and *Millionaire*, *Baron*, a real estate simulation, employs the computer to its greatest advantage by simulating real life situations in a continually changing environment. Although games, each program also teaches. *Baron* deals with buying and selling three types of property: residential, commercial, and land. You attempt to make a million dollars speculating in the real estate market. One session of the game consists of sixty months of real estate activity. Each month, the program provides you with excerpts from current real estate journals indicating various market trends, mortgage rates, and various geographic real estate trends. You start as a novice with $35,000 cash. Your net worth changes as you buy, sell, or mortgage your properties. As your net worth increases, so does your ability to take out larger loans, but your closing costs drop. On the other hand, if you fail and your net worth drops below $5,000, you are declared bankrupt.

Each game creates a new real estate market environment. Just as in real life, your success or failure depends upon your ability to analyze real estate trends and capitalize upon them. Because of the length of the game and the amount of information provided each month, you can save your data and start later where you left off. The menu selection gives you a vast amount of information, rapidly recalled when you need to make a decision. You can display graphs of trends, average property prices, options, loans, news and price changes, real estate descriptions, and your portfolio. Real estate listings are extremely graphic and often quite amusing. You handle down payment, interest rates on mortgages, monthly income, first and second mortgages, operating expenses, and net cash flow. You may invest in speculative ventures including limited partnership and real estate investment trusts. Your transaction reports include closing costs.

While the program loads slowly (five or six minutes), it responds extremely quickly once loaded. Like its sister programs, it is beautifully packaged and contains an extremely well produced, well written, and highly educational manual. *Baron* simulates reality so well that it provides considerable excitement in addition to its educational value. I can recommend it highly.

MILLIONAIRE

Blue Chip
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A	B+	*Graphics*
Documentation	A	B	*Value for Money*

Even an expert may find the oscillations of the stock market unpredictable and at times inexplicable. However, certain factors help considerably when you want to make a rational decision on the desirability of buying or selling stock. This educational game gives you some insight into the factors involved based upon profitability, stock market trends such as bull and bear markets, investor confidence, and so on. *Millionaire* introduces you to the world of the bull and bear markets and Put and Call options. You begin with $10,000 in cash and investment opportunities. If your net worth drops below $5,000 during the game, you are bankrupt. If your net worth increases, your investment opportunities increase also, enabling you to take out loans on your net stock worth and advance from a novice to a millionaire investor.

The game covers ninety-one weeks of stock market changes. You can Save the game at any time. You can purchase shares from a number of different industries, including computers, oil and gas, retail, auto, and heavy industry. You even get actually traded shares such as Control Data, IBM, K-Mart, Tandy, General Motors, and so on. A vast amount of information, including graphic data on stock market trends or news items, keeps you informed of the changing environment. Stock quotations appear exactly as they do in the *Wall Street Journal*. A menu selection displays graphs, prices, stock portfolios, Call options, Put options, or buy or sell transactions, or lets you borrow against your net worth. All transactions look realistic, showing the

value of your stocks, the margins accounts, sales commissions, and taxes. You can browse the history of each company, or view your own portfolio at any time.

Once loaded, the game moves quickly. The accompanying booklet is well written and very educational in its own way. It also refers to some of the classic books on the topic. Of the three simulation games (*Tycoon, Baron, Millionaire*), *Millionaire* is the easiest to play and most likely to interest the whole family. I recommend it highly for both fun and learning about the stock market.

TYCOON

Blue Chip
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	Hard	*Challenge*
Creativity	A	B+	*Graphics*
Documentation	A	B+	*Value for Money*

The commodity market may prove extremely hazardous to both your physical and financial well-being. You can make or lose a fortune by trading in such exotic materials as pork bellies, heating oil, soybeans, and foreign currency, because a ten percent rise or fall can make or break you. The fear of having truckloads of pork bellies dumped on your doorstep haunts the uninitiated, but you need not remain ignorant. The excellent book that accompanies *Tycoon* commodity market simulation introduces you to the world of the commodity speculator and hedger. The fast-paced game allows for much of the excitement without the risks. Indeed, playing the game should become a prerequisite to tackling the precarious world of the commodities market.

Like its sisters, *Millionaire* and *Baron*, *Tycoon* takes a long time to load (five to six minutes), but once loaded moves quickly. Not only does each commodity have a specified percentage margin requirement, you must also pay brokerage commission on each transaction. You have repeated and sequential access to the factors which influence price changes. The news service tells you the effect of changes in weather on various crops, while the complex tax consequences of profits and losses are charged to your account. Various graphs supply you with the commodity index, historical bar charts, weekly scatter plots, three week moving average, and price movements. Real world limits on maximum price changes restrict upward and downward price movements in this volatile market. Once the price goes down the limit, you may not be able to sell your contracts. If you rapidly exceed your margin limits, you may precipitate yourself into bankruptcy. This realistically parallels the real world of commodity markets.

If you don't have time to go the full fifty-seven weeks of this exciting game, you can save your game and return to it later. A demonstration introduces the novice to play. The accompanying booklet contains a particularly valuable glossary. This extremely fast paced, exciting, and educational game provides excellent use of the computer for adult instruction.

WALL STREET

CE Software
$24.95
48K; Apple II/II+/IIe; DOS 3.2 or 3.3

Overall Rating	C	Medium	*Challenge*
Creativity	C	N/A	*Graphics*
Documentation	C	C-	*Value for Money*

Wall Street allows one to nine players to challenge each other to a game of high finance, the object of which is to make more money on the stock market than your opponents. Each player begins with $10,000 and a list of the thirty stocks available from six categories with five companies each. Players also subscribe to an information service that offers five levels of information (each costing a different amount of money and offering different levels of information), and they may obtain regular and emergency loans.

As play begins, you and your opponents (randomly selected) have the option of reading bulletins offered from the information service, buying or selling stocks, or doing absolutely nothing. After each player completes his or her transactions, the trading ends and a new trading day begins. This cycle continues until you complete all trading on Friday. On Friday, you pay all your expenses, such as brokers' commissions, interest on loans, and information service costs. Then the program displays each player's financial report. If any player has $1,000,000, or all but one have gone bankrupt, the game ends. You can also end the game temporarily, begin another trading week, or end the game permanently and declare the player with the highest assets the winner.

I found the game rather slow and dependent on chance rather than skill. Any similarities to real trading have eluded this particular program. One change that would make the game more realistic would be a limit to the time you could spend on your decisions. The disk is protected, so you can't make this change yourself.

Games allowing multiple players are rare, so you may want to take a look at *Wall Street*. However, be prepared to take turns at the keyboard and look away from the monitor while your opponents make their decisions. Also, allow a good deal of time for completion of the game.

WORLD CURRENCY TRADER

Telephone Software Connection
$25.00 via modem; $35.00 mail order
48K; II/II+/IIe/IIc

Overall Rating	C+	Easy	*Challenge*
Creativity	B-	B+	*Graphics*
Documentation	A	C	*Value for Money*

World Currency Trader "simulates trading in up to ten major currencies (plus gold and silver)." It's self-documenting and easy to run. All currencies appear on the screen. The program cycles through each, making random changes. You can stop the program at any point and place currency buy or sell orders. The screen shows your portfolio changes along with the state of your account.

This game has one major deficiency: you can never buy or sell at the price shown on the screen. You press the space bar to place an order, but the program recognizes the command only at the end of each update. That means that if you see a value you want to trade at, you won't get it; the program will update the figures before recognizing the space bar. Thus, you must anticipate the "market," which is simply a random number generator in the short run. If the update doesn't produce a result you want, you must back out of the transaction and wait for the next one. This time-consuming arrangment detracts from the interest of the game.

Sports

BERMUDA RACE

Howard W. Sams
$29.95
48K

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B	B	*Value for Money*

Bermuda Race is a sailing simulation for one or two players in which you attempt to maneuver your sloop from Newport, Rhode Island to Bermuda. The race is actually just one portion of the disk. The other part is a tutorial explaining the basics of sailing, nautical terms, and navigation instructions complete with illustrations. For the first time sailor, this material will have to be reviewed often before it can be digested and remembered. (Having some of the information duplicated in the documentation would have been a help.)

There are five screens in *Bermuda Race* which you choose by pressing "H" for Help, "S" for Sail, "K" for Keel, "C" for Chart, and "R" for Status Report. The status screen is the most important. This text screen displays important information such as: wave height, boat speed, luff angle, wind direction, and speed. This is also where you enter your desired heading using either the left and right arrow keys or game paddles. Either method works well, although the paddles are quicker. To change course from 0 to 180 degrees using the arrow keys, you have to press the arrow key 180 times. Changing course 180 degrees with the game paddles is done by simply turning them. You can change between paddle or keyboard control in the middle of a game by pressing "X."

Pressing "C" shows your position and progress on one of three charts: Newport, Bermuda, or the Atlantic Ocean. These charts are well done with the only limitation being that only the last 90 hours of a race are charted. In a two player race, one boat will be charted by (.) and the other by (+).

You can raise or lower the centerboard, or keel, by pressing "K" and then "U" for Up, or "D" for Down. The amount of sail is increased or decreased by choosing "S" to get to the Sail Screen. The computer tells you the maximum amount of sail you can safely carry under the present wind conditions.

One turn is completed by setting your course, changing the keel or sail, and then pressing Return. The computer will then determine your progress and display the new conditions on the status screen. While you are in the Newport or Bermuda area, each turn represents fifteen minutes of real time while one turn in the Atlantic represents one hour. Since you are racing against the clock, the fastest time to Bermuda wins. Additional penalty times or delays may occur. The program maintains the best five times on disk in the player's Hall of Fame to give you something to set your sights on.

COMPUTER BASEBALL

Strategic Simulations, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Creativity	A	B	*Graphics*
Documentation	A	A	*Value for Money*

The owner of this baseball simulation can ignore baseball strikes and immerse himself in games between any of the twenty-six World Series contenders as played on the Apple. Excellent versatility marks this game. You can manage one or two teams, or let the Apple handle both while you watch a demo game, play alone, or play against another person. The demo mode, called up from the menu, pits the 1980 AL and NL champions against each other; however, you can call any teams into play in this mode. For any of the modes, you select your two teams, set up your own teams (cheating, if you wish, by choosing nine .400 hitters), or have one team play against itself using different pitchers or batting orders.

Rather than delivering lots of action, this game involves managerial skill. Hi-Res animation definitely takes a back seat. Nonetheless, the playing field is attractively and efficiently laid out. Action for each batter begins with a single pitch. He may hit the ball, strike out, walk, or reach base on an error. Each player has unique batting, pitching, and fielding averages and characteristics. Even good fielders occasionally make an error, sluggers pop up, and pitchers tire. (Pitchers also require a warm-up period.) You, as Manager, control your teams bullpen and bench of pinch hitters. Like

a real manager, you can do nothing more than sit back and watch once you have made your decisions.

The simplicity of command required for this complex simulation constitutes a major achievement of *Computer Baseball.* A single paddle and the keyboard provide complete control. The versatility and low price of this well-modeled simulation result in a very realistic game, a bargain even at a higher price.

COMPUTER QUARTERBACK

Strategic Simulations, Inc.
$39.95
48K; Apple II+/IIe/IIc

Overall Rating	B	Easy	*Challenge*
Creativity	B	C-	*Graphics*
Documentation	B	B	*Value for Money*

A real-time simulation of an NFL football game, *Computer Quarterback* makes good use of Strategic Simulation's modeling techniques (used in their war game software). A single black and white display compactly presents a well-annotated football field, a scoreboard, last play results, and both offensive and defensive team alignments. You use paddles to select offensive/defensive plays (also shown on the scoreboard by numbers) and to put the ball into play.

Two players may compete in either a Semi-Pro or Pro version, which differ as to the team selection and determination of player abilities, as well as the relative number of play selections. A single player may compete against the Apple Robots in a Semi-Pro setting. The game plays reasonably quickly despite rather distracting delays between plays, and involves you well.

Despite a rather awkward and involved booting and start-up process, you can learn the game quickly and easily. You'll have much more trouble mastering and understanding the probabilities or assessing the accuracy of the modeling interactions. Certainly, the same offensive plays produce a variable result against a given defense. In the single player game, the Apple employs a reasonable and varying set of play selections as a function of field position, time remaining, and score.

If you want a trivial football game with colorful displays, sound effects, and superficial plays, try something else. However, *Computer Quarterback* provides armchair football freaks with a high level of nonrepetitive challenge. An excellent value.

HI-RES COMPUTER GOLF

Avant-Garde Creations
$30.00
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Graphics*
Documentation	A	B	*Value for Money*

Hi-Res Computer Golf comes on a single two-sided disk. This brightly colored game comes closer to simulating a true game of golf than you'd think possible. The first side permits one to four players to play any of five 18 hole, par 72 courses. It offers color bar calibration. The other side offers a demo game, the opportunity to practice your swing, and a practice hole.

Because of the degree of simulation, *Hi-Res Golf* essentially starts where earlier golf games for the Apple left off. Virtually the only things you don't get are the exercise and fresh air, although one finger gets a good workout. As with real golf, the swing is the key: you must time your swing properly by guiding it through the groove displayed on the screen (somewhat akin to *Olympic Decathlon*). A good sense of timing takes practice. You should spend much of your initial time on the second side of the disk, which the documentation follows on a paragraph by paragraph basis. Together, the practice side of the disk and the documentation lead you through the game's features in a manner that other software houses would do well to note.

If the swing doesn't hit the ball squarely, strange things happen: hooks, slices, undercutting, and topping of the ball. Naturally, you can't swing until you choose the right club from your bag. You can choose from two woods, five irons, and a putter. Each has its own trajectory and range as a function of how hard you hit the ball (on a scale of one to ten). Sand and water traps, trees, rough, boundaries (although sometimes your ball will ricochet off a tree rather than going out of bounds)—all complicate your game, as if the variable wind conditions and contoured greens weren't enough. Each time you play a course, the hole sequence, tee location, green contours, and hole location change.

Hi-Res Computer Golf provides logical and easily remembered system commands, plus a table of distance and swing strength versus club type, and Hi-Res views of the green and fairway (requiring multiple screens in most cases). You can also call up a score sheet, which you can print out at the end of the game. The beginner's course offers a distance scale. Judging distance plays a significant role on the tougher courses.

Aside from the long headers, the game has two weaknesses. First, after missing the ball you must reselect the club, swing strength, and direction rather than using the last set as default values. Second, the current game

status is constantly written to the protected disk. This means that while you may restart the game, you cannot play a second game without wiping out the saved game.

Hi-Res Computer Golf is both challenging and well implemented. Excellent documentation eases your learning (training?) phase. Even if it isn't raining, good golfers could easily get hooked into staying in front of the Apple—to say nothing of everyone else in the family.

MICRO LEAGUE BASEBALL

Micro League Sports Association
$39.95
48K; II/II+/IIe/IIc

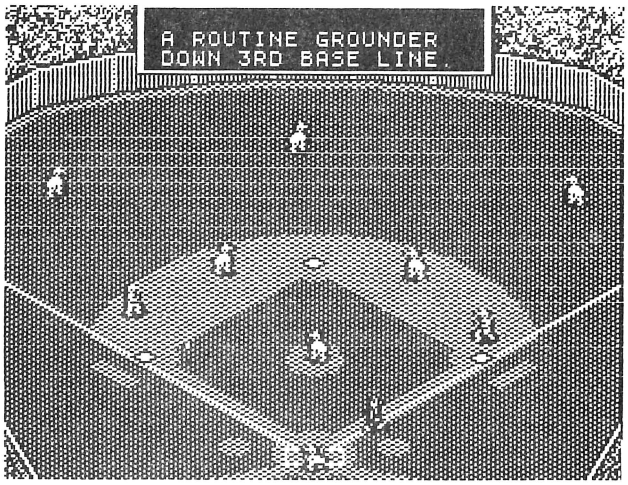
Overall Rating	B+	Easy	*Challenge*
Documentation	B	B	*Creativity*
Value for Money	B+	B+	*Graphics*

Baseball strategy games have become more popular over the last few baseball seasons, especially with sports fans whose terrible hand/eye coordination makes playing arcade game versions of their favorite passtime impossible. Instead, they turn to contests based on player hitting and pitching statistics. Most of these simulations (until now) have either been inaccurate, had uninspiring graphics, or both.

The statistical algorithms used in Micro League Baseball work so well the game has been endorsed by several major league team managers and is an official licensee of Major League Baseball. The authors incorporated every detail in their calculations; speed of the base runner, ability to steal bases, throwing accuracy of fielders, and tendency to make fielding errors. Although players have little control over the fielders this attention to detail is what makes the game realistic. The game is a statistical flexing of data influenced only by chance and managerial option. No two games are ever the same.

The game can be played by either two human opponents or by one player against the computer. Data for twenty-five teams comes with the game disk. These include the 1984 American and National League All-Stars, and many spectacular teams from recent years and the past like the 1983 Baltimore Orioles, 1978 and 1927 (including Babe Ruth and Lou Gehrig) New York Yankees, 1979 Pittsburgh Pirates, and 1955 Washington Senators, a sure team to test your managerial skills. Additional team disks, like one with all the major league teams for 1984, are available for $19.95 each. There is even supposed to be (we haven't seen or tested it) an Owner's Disk that allows player trades between teams.

The game is really simple to use. The lineups are efficiently selected by first choosing the number of the batting order and then choosing the player from the top of the bench. The Return key rolls the bench up one player at a time until you have your choice. The Escape key gives you the historically accurate lineup. You still have a pitcher start warming up in the bullpen, but you can do that after the game has begun. You call offensive and defensive plays by number from your manager's card (supplied). For example, you can get your batter to swing or bunt by pressing the 0 or 6 keys respectively. Once a runner is on base, you can steal, call for aggressive running, hit a sacrifice bunt, or call for a pinch hitter or runner. Defensive plays are mostly different pitches, calls for an intentional walk, and moving the infield in on the pitch.



The game's screen animated, hi-res and colorful, almost arcade style and is very fast. The graphics are realistic; runners slide into bases and the ball's shadow indicates whether it is a ground ball or pop fly. The team even comes out of the dugout at the beginning of the inning and retires at the end.

Not every pitch is shown, but you're told about strikeouts with messages like "2-1 fastball, struck him out." Hits are shown immediately. The message board also gives play-by-play commentary. A typical game takes about forty minutes.

While testing the program, I played a game between the 1978 New York Yankees (computer managed) and the 1979 Pittsburgh Pirates. After three Pirate runs in the third which I attributed to aggressive base running, the Yankees pulled their pitcher. A successful steal in the seventh was immediately followed by Stargell's home run driving in two more runs. In the ninth, even with a lead of 7 to 0, I pulled the pitcher after he threw a wild pitch. I wasn't taking any chances.

Overall, playing a statistical game is quite satisfying, even to an arcade fanatic like me. Unlike SSI and Epyx statistical simulations, *Micro League Baseball* plays realistic ball. It is accurate and frees the player from the tedious charts used in the old board games.

PROFESSIONAL TOUR GOLF

Strategic Simulations, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B-	Medium	*Challenge*
Creativity	C+	B	*Graphics*
Documentation	C+	B-	*Value for Money*

This good simulation of golf offers two of the most difficult courses possible, Pebble Beach and a course made up of eighteen of the toughest holes on American courses. One to four players, after due consideration of their individual styles, choose from among twenty male professional golfers the one who best represents his or her style. Then you decide whether to include the computer as a player, which course to play, and whether or not to play with a wind factor. Hi-Res graphics display the holes from an aerial view, clearly showing the fairways, sand traps, water hazards, trees, and greens. You decide on the club, the direction to hit the ball, and whether or not to slice, hook, fade, or otherwise vary your shot. You can also change your mind and start over with club selection. The display shows you where your ball will land, and hints as to the relation of the ball and the cup. A Help screen shows you average distances possible with each club should you need help in choosing.

As you progress toward the green, you execute shots the same way. Once you reach the green, you learn the distance to the hole and the green difficulty factor. You then decide whether to putt normally, lag putt, or charge putt. The first player on the green putts out before another player starts putting. After you sink your putt, your scorecard is displayed and updated. If at any time it starts to rain (if, for instance, dinner is ready), you can save your game on a separate disk and resume play when the skies clear (after dessert). The program disk is not copyable. After completing the round, you can save the game on a separate disk or just remove the disks and turn the computer off. You must pay attention to the computer referred to by the instruction manual, because it covers both the Apple and Commodore 64 computers.

Gambling and Cards

BLACKJACK STRATEGY

Soft Images
$69.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	Medium	*Challenge*
Creativity	B+	A-	*Graphics*
Documentation	D	B	*Value for Money*

Blackjack Strategy is the first Apple program to consider the casinos' post-counting strategy and help you develop alternative approaches to bringing the odds back in your favor. It combines three different programs: a game, a tutor, and a simulator. The game pits you against a computer dealer. The tutor reads a strategy file that you have created (or the one provided) and then tests you to see how well you follow your defined strategy during game play. The simulator reads playing and betting files, then uses the rules defined in the files to play a number of games. Statistics from the games show you how well your strategies work.

This program relies on the so-called "zero-memory" strategies for playing blackjack. These strategies developed after casinos started using multiple decks of cards and random shuffling in order to discourage card counters. With zero-memory, you need not know what cards have been played or what cards might still be in the deck; only the cards showing enter into play. Unlike card counting, which has a single set of rules, you can study a number of zero-memory strategies. To accommodate these, the program has a video editor that makes creating command tables easy. You can check any number of these strategies using the simulation function.

Game play is fast and straightforward. Only one person can play. You can read the card images easily, and the program adds up your score to save you the trouble. Play commands and a running total of your money appear onscreen at all times. The program incorporates all of the rules, including the ability to surrender.

The simulator and tutor both use strategy files. I found it difficult to follow the BASIC code, so could not determine if the Applesoft RND function properly shuffled the cards. Three identical simulation runs of one hundred hands using five decks of cards produced significantly different statistics, indicating some modification of the basic RND function (which isn't truly random).

The poor documentation, although it looks professional, has no meat on the bones. Each topic gets minimal discussion; zero-memory strategy development gets none. The documentation tells you how to fill out the command tables, but not how to develop the information that goes into the tables. At a minimum, the documentation should completely describe how the tables provided were derived (the logic behind the derivation, not the mechanics of entry).

An interesting program, but I doubt the casinos will allow you to bring your Apple to their gaming tables.

BRIDGE BARON

Interactive Game Products
$49.95
48K; II/II+/IIe/IIc

Overall Rating	B	Medium	*Challenge*
Documentation	C	C	*Creativity*
Value for Money	B	C	*Graphics*

Bridge Baron is the first program I've seen that can play a decent game of contract bridge. Tom Throop, who wrote a bridge and chess column for Creative Computing some years back, has devoted the last four years to developing the algorithms used here, and, generally, they work. The program certainly has some weaknesses, and bridge professionals would probably consider it a joke, but it plays worlds above the caliber of its competition, *Bridge 4.0* and *Bridgemaster* (reviewed elsewhere in this book). In fact, to give you an idea, the three of them and a fourth (available only on the Commodore), took part in a tournament at the Midway Bridge Club in Queens, New York in January, 1985. They were rated by experts on how they played fifteen preselected hands; five on bidding, five on declarer play, and five on defensive play. *Bridge Baron* scored forty-five percent while the other two Apple programs scored five percent and ten percent.

In *Bridge Baron* you bid and play with three computer players. You can, as South, both bid and play the deal if you are the declarer, or play the defense if the opposition bids the contract. Or, using other options,

you may practice bidding and play the hands you like, or just practice declarer play with a recommended bid and the stronger pair of hands. There are slightly over a million different hands, and any hand can be repeated if you jot down the hand number.

Bid and play make up the two parts of the program. It runs on a 48K Apple with some disk swapping. However, it works more efficiently (no disk access) on a 128K IIc or IIe. Hands are automatically displayed and sorted by suit. Bids are made by simply typing "P" for pass or "INT" for one no trump. You can double but not redouble. Similarly, during play, cards are played with two letter commands like "KC" for King of Clubs. The suit is immediately translated into the club symbol after you press return. The game has excellent error trapping and won't let you illegally play the wrong suit. There is no way to simply declare the remaining tricks even if it's obvious that they're yours. Incidentally, there is a peek key, Ctrl-P, that shows all the cards during play. At game's end you can print the results of both bid and play for all thirteen tricks.

The program has strong and weak points, and bidding is its weak point. Although it employs Stayman, Blackwood, and Gerber bidding conventions, once you get past the second round, it gives up too easily and you end up with a weak contract.

Play is much better; it finesses well and is able to get to its partner's hand easily on offense. It has some annoying idiosyncrasies on defense—it often makes dumb plays, such as not taking a winning trick when it should or leading out of the killing suit. Sometimes it has three good diamond tricks and instead of taking them, leads another suit. Perhaps I'm being harsh. The program is good, but not as good as top bridge players.

In sum, let's say that, as of August 1985, *Bridge Baron* is the best bridge program on the market. It's good, but in instances of unusual hands, experienced players will find both weak plays and bids. Still, it plays an enjoyable game and can be quite useful in improving your game, particularly for novice and intermediate players. A good buy.

BRIDGE 4.0

Artworx
$24.95
48K; II/II+/IIe/IIc

Overall Rating	C-	Easy	*Challenge*
Documentation	C-	C	*Creativity*
Value for Money	C-	N/A	*Graphics*

Bridge 4.0, an upgrade of two previous versions, allows you to play contract bridge with the help of a computer partner against two other computer opponents. The program consists of two parts: bidding the contract and playing out the hand, either as declarer or defender. Because the program requires a seed number for the deal, the same seed number would allow another player to play the same hands as in duplicate bridge.

The bidding system ostensibly follows Goren's point-count bidding system, but because of memory limitations it only incorporates the fundamental features. Most of these features and idiosyncrasies are explained in the documentation. Bidding is the program's weakest point, but at least this version can respond in, or to, a second suit; the last version couldn't. The program can handle doubles, but not redoubles. Artworx claims that you can expect the proper contract about seventy-five percent of the time, but we found that it was closer to sixty percent. It is quite annoying when you are the declarer to find that your partner has insufficient support or that all of his or her suits are evenly split.

The hand is played out on a nicely formatted text display with the cards arranged both by rank and suit. If you or your partner are the declarer, you play the hand, even if you are dummy. A king of diamonds is played by typing KD. Error-checking is fine; the computer will inform you if you have made a wrong lead. This latest version allows you to terminate a hand either by claiming the remaining tricks with the CL command or by conceding the remaining tricks with CO. The computer plays its hand better defensively than offensively. It has a tendency to lead mostly high cards, and it doesn't appear to finesse very well.

Avid bridge players will find fault with this program. Apart from the limitations discussed above, the computer cheats, or at least it did in version 2.0. Its programmer, in an attempt to develop an algorithm that could play both offense and defense in a limited amount of memory, found it necessary to allow the computer some knowledge of its opponent's hand. But even with this advantage it doesn't play well. While novices or average players may benefit from the program, advanced players will find it barely tolerable.

BRIDGEMASTER

Dynacomp, Inc.
$29.95
48K; II/II+/IIe

Overall Rating	C+	Easy	*Challenge*
Creativity	B	N/A	*Graphics*
Documentation	C-	A	*Value for Money*

Bridgemaster is the successor to Dynacomp's *Bridge 2.0* and is one of the best available bridge games for the

Apple; unfortunately, it still leaves a lot to be desired. *Bridgemaster* offers 1,000 different hands on a neatly laid out, B&W, all-text playing field; duplicate scoring; and running score sheets for different players. It does not provide a "Claim" feature, so all hands must be fully played out.

At present, the disk is provided in DOS 3.2 only. However, it is not protected and may be MUFFINed up to DOS 3.3, and may also be revised to suit your whims and programming ability. The review disk suffered badly from several syntax errors, one of which bombed the program whenever N or S tried to open the bidding. The verified fix from Dynacomp is to copy down lines 850 and 910 of the program SET DEAL, and replicate them exactly as lines 850 and 910 of DEAL.

The documentation is somewhat long on hype and short on game bidding conventions and menu descriptions. It supports doubles, preemptive bids, Blackwood, and Stayman (read the documentation carefully on this one). Given the proper holding, your partner will jump overcall or jump shift your opening bid, but he will seldom overcall an EW opener, even when holding an opening hand himself. North is not prone to shift suits or support your second rebid of an opener, even when holding three small cards. Your North partner loves to bid four card suits, again and again, even if he has two other biddable (and higher ranking) four card suits. He seems to keep bidding on the basis of combined point count, pushing his suit until he reaches the correct level, with the proper suit being left to you as South.

Bridgemaster plays EW hands offensively as well as defensively, but the play is conservative and predictable. When NS is defending, the computer plays the concealed North hand. All closed hands have the unfortunate penchant of leading aces and kings off the top, although an ace may be underled against No-Trump contracts. Against a suit contract, an EW declarer always pulls trump, even at the cost of losing trump control; an offensive cross-ruff algorithm is not provided. The game plays without finesse, so why should you? At least it will usually play second hand low.

The speed of play for each trick is excellent; there is a five second delay after the last card for each trick played, and a lengthy delay before getting on to the next hand. Preset hands are supported, but can't be saved. *Bridgemaster* won't take the place of a good instruction book on learning the game; but it is a step in the right direction, and will give a novice good play as well as practice in getting upset with his partner. Intermediate players will be astonished to find that their game has suddenly improved. Advanced players will have to wait awhile for a good challenge.

CROSSWORD MAGIC 2.0

Mindscape
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	N/A	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	B+	B+	*Value for Money*

Crossword Magic presents a fun way to create crossword puzzles. The puzzles that it creates from lists of words that you provide are of the British format, rather than the kind you are used to working in newspaper columns. These puzzles, lacking a tight interlocking symmetrical form, have many more black spaces because the words, although interconnected, are more strung out. The puzzle can range in size from a 3 by 3 square to a 20 by 20 square.

The package consists of two disks: a master disk and a player disk. The process of making a puzzle is both interactive and creative. You can arbitrarily choose a theme, enter in words one at a time, and watch the computer instantly insert the word in the puzzle. The puzzle format can be a fixed size, or can be expanded to fit in new words. If the computer cannot use the word immediately, it stores the word for later use. Because the process is interactive, you can choose words as you go, either to connect to the chain of linked words or to bridge a gap. The computer is quite capable of filling in the letters for SPAN if the P and A were missing, or the P and N were missing. There is no guarantee, however, that the computer won't decide that SPAN should cross the word EGRESS instead. In this latest version, you can press the R key to Reposition the word for another possible fit, if one is available. You may also delete the last word should you make a mistake. These options were not available when the program was first released, and are a welcome addition.

After you have inserted all the words in the puzzle, it's clue time. This is where children have the most fun. You may dream up strange or humorous clues, limited only by your imagination. When the clues are finished, the computer will step through them, enabling you to edit any errors.

Puzzles can be saved to disk for later play, or dumped to either a Silentype or Epson printer with graphics capabilities. The printout contains the blank puzzle, with the clues listed below and the answers at the very bottom. The answers can be clipped off before distributing the crossword puzzle to the various players.

The player disk allows you to solve a puzzle. Puzzles are first transferred to this disk from the master disk. You use the arrow keys for movement over the crossword pattern; the space bar toggles the direction. When the cursor is on any black or filled-in square, the

clue is displayed. You can type the answers in, or correct any mistakes. The computer will keep track of your errors. If you finish, or choose to peek at a solution, the correct answer will be identified with inverse lettering, with the errors in normal lettering.

Crossword Magic is exceptionally easy to use, suitable both for home and educational applications; it seems particularly useful for children who rebel at any program which teaches verbal skills. The program offers an attractive display and user interface, and without doubt is the best crossword puzzle program available.

GO FISH

Dynacomp, Inc.
$18.95
32K; II/II+/IIe

Overall Rating	C+	Easy	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C	*Value for Money*

Go Fish is the computer version of the classic children's card game of the same name. Basically, it is a game against the computer that is very good at improving memory skills. Two opponents, who have been both dealt five cards, attempt to form groups of four for the rank of the cards that they hold in their hands. They accomplish this by "fishing" for them from their opponent's cards. If successful, they can try again; otherwise, they take a draw card from the deck.

The game is very simple to play. The cards are shown graphically, and automatically arranged by rank in the player's hand. The keyboard inputs are single key, and the computer will not allow illegal inputs. Thus, a young child of six or seven will have no trouble using this program. As to the computer's skill: it plays a mean game of Go Fish. This is expected, since computers, like elephants, never forget.

HORSE RACING CLASSIC

Tuzami Software Inc.
$36.95
48K; II+

Overall Rating	C	Easy	*Challenge*
Creativity	C	C+	*Graphics*
Documentation	B	C	*Value for Money*

This colorful, high-resolution, action filled game simulates some aspects of the action and excitement of a real horse race. It incorporates eight high-resolution color screens with some optional sound effects, such as a horse's trot and the winner's trumpet. Best of all, it's a great party game for one to nine players. Each player starts with $100. You see a display of all the horses in the upcoming race, along with the odds and weight of each horse. Game play is somewhat automatic but based on the horse's odds. If you want to personalize the game, you can change the track and the horses' names. The program records all the horses' statistics and times from the last two races and displays them in a separate table for your convenience. Each player has a simple I.D. number to remember, which helps you keep track of all your wins and losses. As you near post time, the track and horses appear onscreen, color coded according to the jockeys' colors. A separate table in the center of the track keeps tabs on the horses' positions throughout the race. After the race, you can view an instant replay if you wish. The program calculates, records, and graphically displays all gains and losses.

I thought *Horse Racing Classic* very interesting and fun in a party atmosphere. All in all, it gives you a real run for your money.

KEN USTON'S PROFESSIONAL BLACKJACK

Screenplay
$69.95
48K

Overall Rating	B+	Hard	*Challenge*
Creativity	B	C	*Graphics*
Documentation	B-	B	*Value for Money*

Ken Uston's Professional Blackjack is intended to teach the blackjack player three different point-counting strategies that are covered in the author's book *Million Dollar Blackjack*. It is based on the theory that even when the casino is using several decks, the character of the deck constantly swings favor from the house to the player and vice versa. For example, if all four aces have been played, no one can get a blackjack. Since the house pays 3 to 2 for a blackjack, this is unfavorable to the player. Likewise, fives favor the dealer, for house rules require him to hit on 16 or less.

Those who just want to have fun should learn the simplest of the three strategies. Those who wish to have a good time without losing any money should learn the "simple plus/minus" card counting system, and those who want to make money at it should learn the "Uston Advanced Point Count" strategy.

The programs offers several drill sessions where cards are dealt and the player practices his point-counting strategy. This is one of the best blackjack simulations that I have seen. Six players, either human or computer, can sit at any of the six positions at the table. The table can be any casino in the United States. Ths disk has all of the special rules stored for each casino and plays blackjack by those rules. For example, if you choose to play in the Reno-Lake Tahoe area, you can choose between Harrah's Circus Circus and other local casinos. During play a high tone alerts you to whether you have made a strategic error. If you press the space bar, you can refresh your memory with the running count, true count, betting true count, and the status of aces. If you just want to play for fun you can turn off the error prompting sounds.

The disk comes with two separate manuals. The first is a sparse but adequate instruction manual to run the program. The other is a detailed explanation of Ken Uston's point-counting strategies. This book contains valuable colored charts that tell you whether to hit or not depending on your point count and what face card the dealer shows.

This package is higher priced than many other blackjack strategy programs, but it is perhaps the most comprehensive learning tool available to anyone seriously interested in learning to play blackjack for money. Ken is living proof that his strategies work, because he is banned in virtually every casino in the United States where point counting is illegal.

KING CRIBBAGE

Hayden Software
$9.95
48K; II/II+/IIe/IIc

Overall Rating	C+	Medium	*Challenge*
Creativity	A	C	*Graphics*
Documentation	B	B+	*Value for Money*

The third solitaire cribbage game available for the Apple, competing with Sierra On-Line's *Hi-Res Cribbage* and Rainbow's *Cribbage*, *King Cribbage* offers no significant new features, but has its own distinctive personality (both good and bad). Compared to Rainbow's version, it has a good playing algorithm and plays an even, steady game with few weird hands. It has the simplest keyboard operation of the three games, although the other two are not difficult. *King Cribbage* has a consistent and steady pace, easily controlled, unlike Rainbow's which tends to push you along. The display field, although attractive, doesn't compare to that of Sierra On-Line's game. The arty, serpentine playing board makes it hard to identify the Skunk line and doesn't tell you the number of points you are ahead or behind. A separate text page holds a scoring summary. *King Cribbage* has the largest and best drawn cards, but I'd recommend a color monitor because the blue peg used by the Apple becomes a hard to see shade of gray on a black and white monitor. Although Sierra On-Line still has the best overall layout, appearance, and functional display, Hayden isn't too far behind.

For the beginner, Rainbow's tutorial documentation and onscreen scoring may well be worth the price. However, at a slightly lower price Hayden affords a better layout, an equally good playing algorithm, an option to shut off the monotone sounds, and an option that permits you to count your own hand (Muggins). The more advanced player will prefer Sierra On-Line's game, assuming that he or she can tolerate a rather high rate of weird hands. Apart from its better layout and onscreen scoring summary, it alone provides tournament and save game capabilities, as well as clever use of sound. It alone also permits you to retract the first card placed into the Crib (a feature used surprisingly often). However, Hayden's *King Cribbage* runs a close second and should give the others a good run in this three-way race for your money.

PRO-POKER

Quality Software
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	Hard	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	B	B	*Value for Money*

Pro-Poker is a fast-playing Hi-Res California Draw Poker game involving eight hands of poker. Some or all of the hands may be played by you, or automatically played by the computer. If desired, players may be given names. While a save-game option is not available, there is a variety of alternate options available to control the game speed and, in effect, the degree of realism and difficulty. Any option may be invoked at any time without resetting a player's stakes or deal.

The program checks and raises, will occasionally bluff and can be bluffed, and won't show the winning hand unless it has been called (but does show openers). Holding a pair of kings or queens, the program will not open that hand if it's "under the gun," but will open if four previous players have passed. In the last position, it will open with a pair of jacks. A subsequent raise will cause that hand to fold. With three of a kind, it may or may not open, possibly hoping to raise on another opener. The generally conservative line of play makes

more sense if all hands are played face up—one of the options—since the odds don't favor drawing a desired card because 40 cards have already been dealt. The only criticism of the playing rules is that a disproportionally high number of four-card flushes seem to get filled, but there is no indication that the computer "peeks" or favors any hand.

The Hi-Res cards are well-sized, realistic, and clearly legible on a black-and-white screen. In the face-down mode, a player's cards are concealed unless it's his turn to bet or draw, thus providing a degree of privacy for multiple players. There are three speeds of play and an Auto-Stop option to speed up slow operations if you wish. In the fast mode with the Auto-Stop off, over ten rounds of eight hands are played in less than a minute, permitting you to view the long-term money flow. Best of all, there is a Kibbitz command which suggests what you should do with your particular hand and shows the probability of someone else having a better hand than you. *Pro-Poker*, the best poker simulation game on the market, is a rarity in that it's one of the few that effectively tutors you in becoming a better player.

SOLITAIRE

Computek
$29.95
48K; II/II+/IIe

Overall Rating	B	Easy	*Challenge*
Creativity	B	A	*Graphics*
Documentation	C	A	*Value for Money*

Solitaire provides four versions of Hi-Res solitaire card games, including two that I'd not seen previously. The most popular game, Klondike, comes in two versions: the multiple pass, which consists of rolling three cards off the pile with as many passes through the pile as you wish or until you deplete the pile; and the single pass, in which you remove one card at a time (favored by gamblers). The other two games are Picture Frame and Pyramid. In the former, you place all picture cards into specified locations in the "frame." In the latter, you remove all cards from the "pyramid."

The neatly laid out Hi-Res playing fields display some color, but the games play more easily with a black and white monitor because of the better contrast between the red and black suits. The square representations of cards look reasonable in size, but not overly artful in design. These fun games respond quickly to the easily learned single-key commands. In fact, the games are so easy to learn that you may find yourself addicted to playing them.

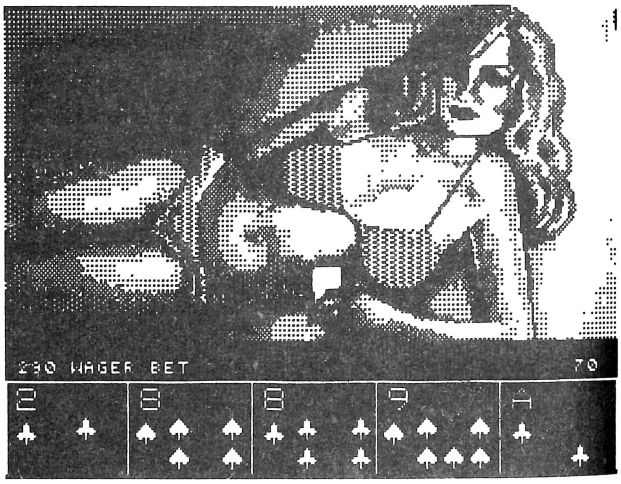
STRIP POKER

Artworx
$29.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B-	Easy	*Challenge*
Creativity	B-	A-	*Graphics*
Documentation	C	B-	*Value for Money*

Strip Poker makes an excellent party game. Several people can take turns in an attempt to win the clothes off either of two pretty young opponents who play in very different styles. Suzi plays terrible poker. She bluffs continuously, raises a lot, and rarely has a decent hand. Melissa, on the other hand, can usually beat an opponent whose luck isn't with him.

The object of the game, of course, is to beat either of the two girls in Draw Poker. If either of the opponents runs out of money, he or she trades a piece of clothing for $100. If they win money back, they may repurchase the clothing. There are four Hi-Res screens; the last shows the girls completely naked.



The cards are dealt to the player and appear beneath the opponent's picture. All choices are made with the two arrow keys, confirmed by pressing the space bar. Players can drop, stay, or bet. They can discard one or more cards in hope of getting a better hand. The computer doesn't cheat. However, there is a bad flaw in the Applesoft random number generator: each time the game begins the order of the deck of cards and the opening hands are identical. You are always dealt a pair of twos, a three, a four, and a six. Your opponent always beats you with three aces.

Overall, the game is entertaining and fun to play and contains some good graphics. It holds your interest through more than one play, if only until you strip both girls.

Board Games

CHECKERS

Odesta
$49.95
48K; Apple II/II+/IIe/IIc/III

Overall Rating	A	Hard	*Challenge*
Creativity	B+	A	*Graphics*
Documentation	A	B+	*Value for Money*

Checkers is an excellent checkers game for the Apple. It has 16 levels of play, and is suitable for both novices and experienced players. It has very nice graphics, and utilizes game paddles for movement of the board pieces. The options are numerous. For instance, the program plays against itself, you can turn the sound off, ask for advice, choose a two-player mode, take back a move, and utilize a replay feature which allows an entire game to be replayed move by move. The lower levels of play are made challenging by the speed of play and the seeming infallibility of the program. The higher levels of play take geometrically longer time for a move (about 3 seconds a move at level 5). A feature provided for the true expert (or for the artifical intelligence experimenter) is the ability to change certain parameters that the program uses for decision making.

The program is not without fault. One feature omitted is a save-game option. This could be especially useful at the higher skill levels. The price is also a bit high for the average checkers dabbler. For the serious player, though, or for someone serious about learning the game, this program is excellent, and could be the definitive checkers game for the Apple.

CHESS 7.0

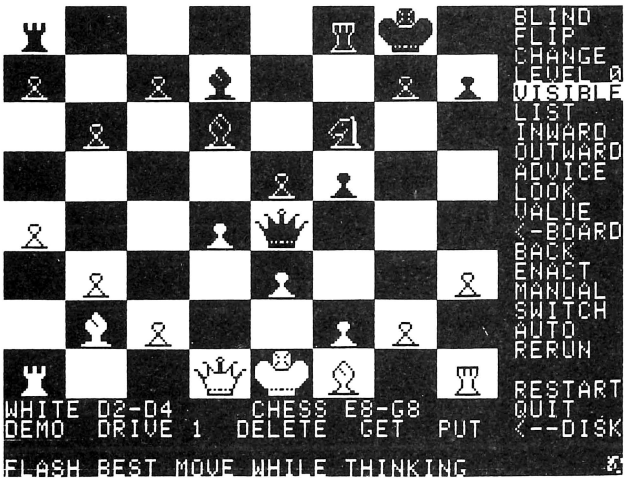
Odesta
$69.95
48K; Apple II/II+/IIe/IIc/III in emulation mode

Overall Rating	A+	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	A+	A-	*Value for Money*

Chess 7.0 is the definitive chess game available on the Apple and Atari computers. While it is difficult to accurately judge its chess rating, it appears to be at least 1650 or more life points. More important to the user, it has a significantly faster response time than *Sargon II* and performs well in the end game—a weakness in most other micro-computer chess games.

This implementation of the ancient strategy game is designed both for ease of use and for teaching the player to improve his game. The pieces on the playing board and all the options displayed at the right side of the board are accessed by either a paddle controller, or by moving the right and left keyboard arrow keys. Moves are made by first selecting the desired piece and then choosing the legal move. Confirmation is by paddle button or return key. Only legal moves are shown by the cursor. This is true even if a king is in check and the player wants to move a rook to block it (only the rook's one move that actually blocks the check is allowed). A wrong move can easily be retracted, but once the piece is actually moved, you will have to wait for the computer's response in order to enter the option mode to retract.

This extensive option mode allows you to change levels, set up special problems, play blindfold chess, save games to disk, retract moves, switch sides, replay all the moves in a game, and get advice on your next move. The computer can even play both sides in a demo game, or play one of forty famous chess games from the past. These are all stored on the disk.



The computer can play at various chess levels from beginner to advanced. Response time is important in choosing a level of play. Either timelimited levels or depth-limited levels are available. For example, in the evaluation of this program I used level six—an advanced

one—which takes between two and six minutes to look three and six ply (half moves) ahead. Depth-limited levels can range up to eight ply ahead, but this can take from five to twenty hours. There is even a mate finder mode which will look eight moves ahead to solve special end game problems. This too takes several hours. The program does attempt to speed up the response time in the beginning of the game by using an opening library of nearly 4000 moves. This gives it a definite advantage against any beginner.

I tested *Chess 7.0* against a chess player with a rating of 1800 life points. The first game was played on level four, which looks two to four ply ahead, and has an average response time of ninety seconds. The player found the program to be a good intermediate opponent with a sound but limited strategy. The computer obviously wasn't looking far enough ahead to anticipate moves; however, it made no obvious blunders. The second game was played on level six, which has an average response time of four minutes and looks three to six plays ahead. Using the Dutch defense as its opening, the program proved a very challenging opponent. It was virtually a tie throughout the five hour ordeal. The player finally developed a one pawn advantage by endgame, but because the passed pawn was a rook pawn, it nearly resulted in a drawn game. The computer played exceptionally well. My only complaint was that it still took four minutes to respond to an obvious move, and therefore the game play was unduly slow.

The program comes with excellent documentation. It is logically presented, has clear explanations and diagrams, and offers extensive coverage of the game's history and strategy, and the computer's programmed strategy. Both experts and beginners will find *Chess 7.0* an exceptional chess program, both as teacher and opponent. It is certainly the best chess program that I have seen for any microcomputer.

CHIVALRY

Xerox Education Publications
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B-	Medium	*Challenge*
Creativity	C+	A-	*Graphics*
Documentation	B	C	*Value for Money*

This computer-assisted board game combines the old fashioned family parlor game with arcade challenges of simple skill and action. Rich in detail, the game attempts to capture the feel of living in the Middle Ages with a tavern, several castles, a gypsy camp, a market, an armorer's shop, several inns, a swamp, various meadows, and a dark forest. The game board illustrates it all and keeps track of the contestants in their quest to rescue the king imprisoned in the Black Knight's castle. The computer spins a wheel or rolls the dice for each player's move and displays the locale in a colorful Hi-Res picture. Some of the locations are safe spots, but many require you to make a choice or prove your skills in a miniature arcade game, such as dodging rolling barrels while advancing up a hill or catapulting rocks onto shields held by moving serfs at the Royal Park. Some, like the archery contest or the dart game at a friendly tavern, lie with the capabilities of a five year old. Others, like attempting to get out of a pit in a limited amount of time by jumping from ledge to ledge (using a paddle controller), tax even the skilled teenager. Fortunately, the only penalty for failure is to lose one turn.

Probably the highlight of all the games of skill is the jousting match between a player and the computer-controlled knight at the Templar's Castle or the Royal Pavillion. Deceptively simple, the contest requires precise timing for you to hit the knight's red target with your lance without getting knocked out of your saddle by his lance. You control only your knight's vertical position and distance from your opponent (with the paddle). You only get one chance and at most two jousts per game, so learning the precise tactics to win may take some time. If you win, you receive a secret password or sign that may help you later in the game. Losing a joust costs you a turn while your wounds heal.

Thieves and bears roam the woods. A troll guards a shortcut bridge, but if you can get past his swinging club you can save yourself several turns. However, if you fail, your wounds take three turns to heal. Gypsies and witches, rather friendly, challenge you only to guess under which shell they have hidden the pea. You can win a magic potion—or something worse. The effort needed to win flaws an otherwise delightful game. You can become frustrated in your attempts to enter the Black Knight's castle. You must first catapult a rock against a target to lower the drawbridge, while dodging boulders hurled at you from above. Then you must leap from ledge to ledge while dodging rocks. Finally you must defeat the Black Knight in combat. If you lose, it's back to the South Forest, more dice rolls, more pictures, and eventually back to the drawbridge once again.

While *Chivalry* appeals to children six to eleven years of age because of its colorful pictures, cute tunes, and simple games, some of the contests (especially at the end) are too difficult for them. In the earlier contests, luck may get you past even after losing the first time. Older teenagers possess the skill to win the tougher contests, but they won't endure the endless

delays of tunes and pictures between the arcade games. It can be considered a family game because it is only interesting if played by three or four people. However, I caution you that few people will ever win the game, and that players may just give up in frustration. The game needs variable levels of difficulty.

FAST GAMMON

Quality Software
$24.95
32K

Overall Rating	B	Medium	*Challenge*
Creativity	C	B-	*Graphics*
Documentation	B	B	*Value for Money*

From Quality Software Company comes a "Quality" backgammon game. The Hi-Res graphics are very good; response time and error checking are also superior. Quality Software makes no claims that *Fast Gammon* plays an expert's game, and it doesn't. Overall, it is an excellent learning program for beginners and average players, and will provide challenge and practice for better players. Although it has a strong midgame, it has a weakness in its end game. Its major strength is speed of play. One nice built-in feature is the ability to replay a game with the computer repeating its previous moves.

THE GAME

Random House
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	A	B-	*Value for Money*

In this game you must think and move fast to guess a key word from five clues which flash quickly on the screen. The number of game board moves awarded to each player (you and an opponent) depends on how many clues appear before the player presses a stop key, locking out his opponent, and types in the key word. You try to guess the word from as few clues as possible, which moves you faster toward Home.

This colorful, engaging game employs well done Hi-Res graphics and comes with clear and comprehensive documentation. Played on the second level, it challenges even the quick minded. Following the title sequences, it opens with a bugle call to the starting gate, where you have options for the level of play and enter your name. In a short, animated prelude, a red ball bounces between the two name boxes before coming to rest on the box of the starting player. You select your playing piece from five variously shaped pawns which you then move around a game board that looks like a colorful race track. You set the rate at which the clues flash on the screen, from very slow to very fast. Each player has a "stop" key which stops the clues and allows a guess at the key word. Correct answers allow you to move your pawn around the track for a distance set by the quickness of your answer. Wrong answers get an abrupt beep and you lose your turn. The arrow keys control the movement of your pawn, but you must keep track of your direction because moving backward toward Home means forfeiture.

During play, you may encounter one of the several randomly awarded bonus words, which doubles your move if guessed correctly. Orange "chance" squares bring either good or bad tidings when you land on them. The two levels of play offer easy words and an easy game board for the lower level, and a more difficult board and tougher words for the upper level. The winner goes to the winner's circle, where his or her name flashes in a garland of lights while the computer serenades him or her with a lively tune.

The Game comes with fifty key words in each of the two levels, but the word bank menu allows you to change clues and key words or even delete words to make room for others. The menu options make for a nice, open-ended program that can give rise to games involving specialized subjects or even a dandy trivia contest. It sharpens your wits and broadens your definitive skills.

GO

Hayden Software
$9.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	Hard	*Challenge*
Creativity	B	C	*Graphics*
Documentation	C	A	*Value for Money*

The ancient oriental strategy game of *Go* has been implemented on the Apple computer. The object of the game is to control as much territory on the board while losing as few of your stones (pieces) as possible to your opponent. The strategy is to place stones on the intersecting lines of the 19 x 19 board so as to completely surround one or more of your opponent's stones without leaving vacant intersections in the closed area.

Unlike *Othello*, a somewhat simpler game, captured pieces are removed rather than flipped.

Stones are placed one at a time on the board by keyboard control. If you make a mistake it can be corrected in the edit mode. The computer and its opponent, or two opponents, take turns. While a two-opponent game is played in silence, the computer will sound a warning if it is one stone short of surrounding one or more of your pieces, and the word "Atari," an equivalent to "check" in chess, flashes on the screen.

While the game appears simple in concept, it is difficult to master. The number of stones captured is no indication of how well you are doing since the final score is based on the number of vacant points surrounded *minus* the stones captured by your opponent.

Go is not a very popular game in this country, so it was difficult for me to find a suitable opponent to test the computer's skill level against. However, I can say that the computer opponent is not dumb, doesn't fall for traps, and is certainly above the novice level. It is a challenging opponent and teacher for any beginner who has trouble finding a human opponent.

HOW ABOUT A NICE GAME OF CHESS?

Odesta
$69.95
48K; II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Documentation	A+	B	*Creativity*
Value for Money	B	B	*Graphics*

How About a Nice Game of Chess? is a modified version of Larry Atkin's *Chess 7.0*. This version plays chess, but it also teaches the basics of the game through various tutorials, one on the disk in the form of a movie, another in the fifty-three page manual.

This version like its predecessor can suggest moves, show positions susceptible to attack, and display offensive moves available with any piece. Error-checking keeps the novice from making illegal moves. If you are stumped or losing, you can switch sides and watch the computer extricate itself from your bad position. The program can play against itself and even replay a completed game move-by-move. What it can't do is save a game or print game moves for future reference.

Moves can be made by using keyboard, paddles, or mouse. Normally you move the cursor with either your keyboard arrows or paddle to the piece you wish to move; then, after pressing the button, you select a legal move by rotating through the allowed moves. This simplifies things for the beginner, who is liable to make illegal moves, especially with his knight. Under mouse control, the legal moves are lit up. You only need to point to the piece you wish to move, click the button, move to where you wish to place the piece, and click a second time. *Voila!* The piece moves, just as it would on a real board.

There are several marked differences between *How About A Nice Game of Chess?* and *Chess 7.0*. First, *Nice Game* plays only at introductory or intermediate levels. The most advanced level, nine, looks only three to six ply (half moves) ahead. Average response time is two to six minutes. This is the equivalent of the low intermediate level in *Chess 7.0*. The other marked difference is that *Chess 7.0* has about fifty famous chess games stored on the back side of the disk. Because these games can be replayed, they are far more instructive to intermediate players than *Nice Game*'s movie-style tutorials, which are strictly for beginner and low-level intermediate players.

These tutorials cover how the pieces move, check and checkmate, opening strategy and tactics, middle-game tactics and attack, and endgame procedures. Unfortunately, there is no speed control. All of this material is covered equally well in the manual.

While there is no doubt that this fine program can teach and improve a person's chess game, many players will quickly abandon it for stronger chess programs such as *Chess 7.0*, *MyChess*, or *Sargon III*. I think the program is ideal for children and young teens. But any self-motivated learner would do better to buy a good chess book and one of the more advanced chess programs.

L.A. LAND MONOPOLY

ARS Publications
$29.95
48K; Apple II/II+/IIe/IIc

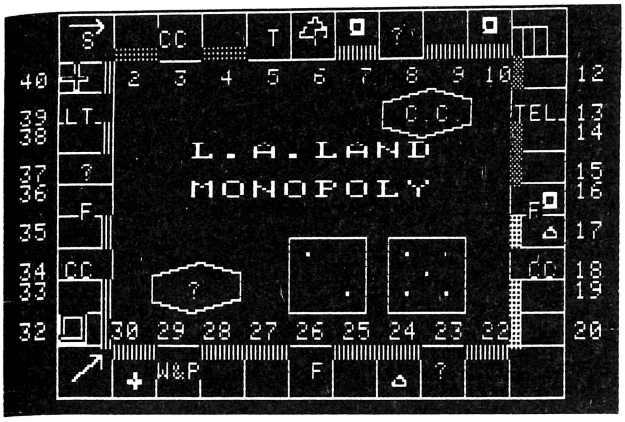
Overall Rating	B+	Easy	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B	B	*Value for Money*

L.A. Land Monopoly is a special Hi-Res adaptation of the familiar game made especially for the Apple computer. Two to six players either create a monopoly game of their choice or play the Los Angeles version which has local street names, freeways instead of railroads, and chance cards that reflect local folklore.

The create your own game module allows the players to invent their own game for any city or town where they live, whether it be San Francisco, Kalamazoo or

Atlantic City. Two different game modules can be saved to the disk for later play.

The game is played on an animated Hi-Res color display board. The dice are rolled on screen, then each player's token automatically advances around the board.



As in the real game one may buy, sell, or mortgage properties and houses. The computer acts as banker and keeps track of money, property ownership and rental charges. All standard rules apply although the players may choose variations at the start. In addition, a game can be saved at any time for later play.

The computer has excellent error checking routines for catching illegal transactions. The documentation is thorough and clearly explains all rules. It also includes charts showing return on investment for various properties. Highly recommended.

MICROGAMMON II

Artsci, Inc.
$19.95
32K

Overall Rating	B-	Easy	*Challenge*
Creativity	C	B	*Graphics*
Documentation	B	B-	*Value for Money*

Microgammon II improves upon Softape's original Backgammon game. In particular, I thought both the user interface and the graphics greatly improved. Playability compares favorably to that of *Fastgammon*, with the addition of the doubling cube. Perhaps the best feature is ease of use. Hitting the space bar moves the diamond-shaped cursor over your legal moves only. Entering the value of the die from the keyboard actually causes the piece to shift. However, the cursor always appears on the piece just moved, so you may have to shift the cursor almost completely around the board in order to move a second piece. You can also take back moves if you change your mind before your turn ends.

MYCHESS II

Datamost
$34.95
48K; II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Documentation	A-	B	*Creativity*
Value for Money	B+	B	*Graphics*

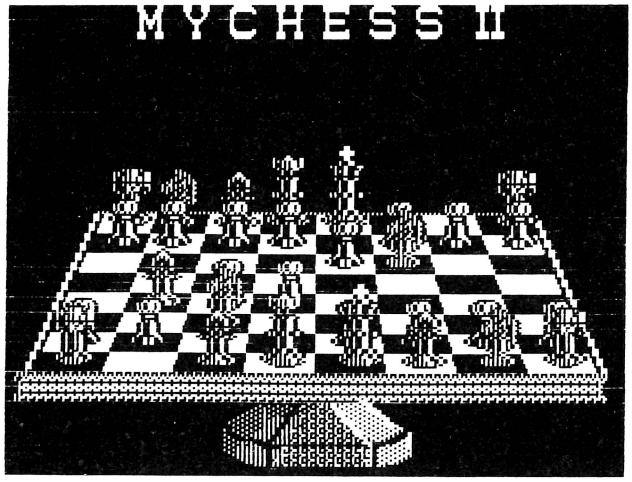
The popularity of chess on microcomputers prompted David Kittenger and Datamost to translate their successful CP/M version of *MyChess* to the Apple II. While it is hard to judge whether they improved its high caliber play, it is immediately clear upon seeing the stunning three-dimensional representation of the board that they added superb graphics.

Mychess II chooses standard algebraic keyboard entry rather than the flashier paddle entry system of *Chess 7.0*. Perhaps the authors thought that their main audience would be mature chess players who, being used to chess notation, wouldn't mind the system. Then again, this keyboard entry system is standard with both *Sargon II* and *Sargon III*. Entry is made by typing in the coordinates of the piece to be moved and its legal destination. For example, to move the White King's pawn two squares you enter E2-E4. Entry is made with either the text or graphics screen displayed. When a piece is chosen for movement on the graphics screen, all the legal moves are highlighted; illegal moves are flagged automatically.

Although the program caters mainly to advanced players with its nine levels of play and special board setup mode for problem-solving sessions, it also offers considerable help to aspiring novices. Players can activate the hint mode to see what the computer recommends or ask to see what pieces are attacking a particular square (2-D graphics mode only). Players can also request that the program show any or all available move positions. *MyChess II* can play itself, or replay the entire game at selectable speed. And for those who keep records of all their interesting games, the moves from any game can be printed.

I have mixed feelings about the graphics. The three-dimensional view mode is stunning with the board tilted back from about twenty-five to thirty degrees. The chess pieces can even be changed from regular to modern, and the board can be rotated around by ninety degree turns. This is often necessary since some pieces tend to be obscured by others at that low angle. A higher view angle of, say, forty-five degrees and a five or ten degree tilt would have been better. Then again,

you can always play the game with the two-dimensional standard display. Since the three-dimensional view is confusing in the early portions of the game, I nearly always play with the standard display. Besides, all of the game's fancy features only work in this mode.



The game's nine play levels range from beginner to advanced. Level two, the default level, can process forty moves in five minutes time. By level seven you are averaging three or more minutes a move. The book says it can play a forty-move game in 120 minutes, not counting your time. Level nine calculates as long as possible until you force the move by pressing the Return key. The number of ply (half moves) that the program is looking ahead is displayed at the lower right corner of the text screen in the form of a letter.

It is hard to define the chess rating of *MyChess* in master points. The old CP/M version was always better than *Sargon II*, but *Sargon III* is better than its predecessor. *MyChess* is probably on par with *Chess 7.0* set at about 1650 or more life points. It's too bad that some of the computer magazines stopped their annual computer chess tournaments.

ODIN

Odesta
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	A	A-	*Value for Money*

The authors of *Odin* wish to offer a program that can teach the intricacies of *Othello* as well as offer a formidable opponent. Formidable isn't the word, for this program plays a devastating game of *Othello*. Fortunately, it offers fourteen levels of play ranging from beginner to super expert, so that players of all skill levels will find it a worthwhile test of ability.

Since *Odin* had been touted as the definitive *Othello* type program for the microcomputer, I felt that *Odin* should challenge the previously top rated program, *QS Reversi*. Therefore, I arranged a match between the two programs. Although the two programs were run on different micros—*Odin* on the Apple and *QS Reversi* on the Atari 800—the similarity of microprocessors made the match even when each of the programs was set on a level that used the same ply (turn) lookahead. They were both set to analyze their moves six full turns ahead. In other words, *QS Reversi* was on level eleven, one level beneath the highest; *Odin* played on its level eight, fully six levels below the highest. While it would have taken an *Othello* expert to analyze the positions as the game progressed, by midgame it appeared to be a virtual tie in both of the games. Both were attempting to secure control of the four center squares while avoiding control of most of the border squares. But in both games of the best out of three series, *Odin* took a clear cut lead in the end and trounced its opponent by scores of 41 to 23, and 46 to 18.

Othello, in case you don't know, is a strategy game played on a 8 by 8 board where the object is to control the most squares. Each player must place a colored tile on a square that will trap at least one of the opponent's pieces between two of his pieces. All of the opponent's trapped pieces are then "flipped" to his color. The game is simple, but difficult to master.

Odin normally plays against an opponent, but can also be used to monitor play between two players. All input is by paddle, or, for those lacking a game controller, by the arrow and return keys. Turning the paddle moves a cursor on the Hi-res board through all of the positions or legal moves, and a menu of other options displayed at the bottom of the screen. Pushing the paddle button chooses that move or selection, if it is an option. The menu, unfortunately, is in the center of paddle rotation. Thus, you move from legal moves to options back to legal moves. This is both unnecessary and confusing.

Most of the menu options were designed for educational purposes. Expect shows you what the computer thinks is your best move based on look-ahead analysis of its previous turn. Scores, on the other hand, shows the relative strengths of all the moves open to you in an immediate analysis. This only tells you the relative number of moves to be gained or lost by your next move. If you're still stumped, you can try the Move command which will allow the computer to take over your position and make the move. It can teach that even a hopeless looking position has a solution.

Other useful options allow you either to take back

your most recent move, or to replay the entire game from the start. The former, although bordering on cheating, does allow you to test different strategies. If you don't like the results you can take back the move and try something different. You could even use the Restore option to take back your move, and then have the computer make your move via the Move command.

The excellent documentation is well organized; it presents each option in alphabetical order and with screen diagrams. There is a bit of history of the game's evolution and a good discussion on strategy, based on the computer's approach to the game.

Odin is the definitive *Othello* program for both the Apple and Atari computers. Beginners will find it an excellent teacher, and experts will discover it to be a worthy opponent.

QS REVERSI

Quality Software
$29.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B	A-	*Value for Money*

QS Reversi may well be the *Othello* champion of the Apple II. Although the game hasn't been entered in tournaments as yet, preliminary bouts against Hayden's *Reversal* while playing at similar advanced levels based on response times, has resulted in *QS Reversi* victories almost consistently. The play is brilliant at times, like two masters sparring against each other. We don't know why one can beat the other, but this version obviously has a much more efficient algorithm.

The program's graphics display and input routines are comparable to those of *Reversal*'s. The Hi-Res board is normally visible, but the text page, with its play-by-play listing, can be toggled by control keys. The move-entry routine is foolproof. Only legal moves, which are displayed via a blinking square whose movement is controlled by the arrow keys, can be entered. The computer waits for you to accept its move before allowing you to continue.

QS Reversi, in addition to offering twelve levels of play, allows you to back up one or more moves so that alternative strategies can be tested. It also offers a tournament entry mode, which requires input for specifying the location of the letter column and number row. One can also handicap either the computer or oneself by giving one or more corners away. One last note: although this program can run on a 32K machine, advanced levels 10-12 require a 48K machine.

SARGON II

Hayden Software
$19.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	B+	*Challenge*
Creativity	B	A-	*Graphics*
Documentation	B+	A	*Value for Money*

Sargon II is one of the best and most powerful chess programs available for the Apple or any other microcomputer. This game and its earlier version had won most of the microcomputer chess tournaments since 1978 until beaten by a Z-80, CP/M-based challenger.

Sargon II offers six levels of play, an excellent Hi-Res board display, the ability to set up chess problems, and a kibbitz mode for players who need a suggestion for a best move. The computer's response time is not exceptionally fast on the higher levels of play. While the first level of play takes only twenty seconds, very advanced levels take an hour or more. However, most advanced players would be humiliated at levels with a response time of from two to six minutes.

The program is very easy to use. Initially, the text page and the board can be toggled by the Escape key, even in the middle of a move. Chess notation is not standard; however, it is perhaps simpler for beginners. The board is lettered horizontally (A-G) and vertically (1-8). Moving the king's pawn two spaces is accomplished by entering E2-E4. Although no hard-copy of your moves is available, the last twenty moves are always displayed on the text page.

Sargon II is a very worthy opponent for any chess enthusiast. It is currently rated at 1400 life points. Because of its style and ease of use, it has to be rated as the finest chess program to date for anyone with a standard Apple.

Construction Sets

ADVENTURE MASTER

CBS Software
$44.95
48K; IIe/IIc 64K; II/II+

Overall Rating	B	N/A	*Challenge*
Documentation	B+	N/A	*Creativity*
Value for Money	B	C	*Vocabulary*
Graphics	B-	1	*Save/Restore*

Anyone who has played adventure games of one sort or another has no doubt marveled at the creativity that must go into implementing such an idea into a piece of computer software. Indeed, the sophistication of today's adventures has reached a level where the introduction of high-resolution graphics into the game is possible without any loss in the intelligence associated with the text. *Adventure Master* gives you an opportunity to go behind the scenes to learn how such a game is created. You do this either by examining in detail any of three adventure games supplied with the program, or, more excitingly, creating your own game from scratch.

Two of the supplied games, Becca in Outlaw Cave, and Wild Trails, (on one of two disks) are incomplete, waiting for you to finish them in your own original way. The third adventure, Clever Catacombs, (on the other disk with the master program itself) is complete and, even for a well-seasoned adventurer, difficult to solve. This program is protected by a password which requires that you solve the mystery before being allowed to examine its contents.

To create a game with *Adventure Master*, you start by making a map of your creation much the same way you would if you were playing a finished game. Then you define the options associated with each room of the game. All of these options are selected from the main menu. For example, Passageways, allows you to determine the directions by which players may leave a room and where (in which room) they will end up. You can also designate specific conditions (e.g., entering a key phrase, being in possession of a particular object, etc.) a player must meet before being allowed to proceed in a certain direction. Magic Words allows you to specify particular words which, when typed in, transport a player form the present room to another room. To let the player know that this transportation has occurred, you can enter a response which will be displayed on the screen.

To use the graphics feature of the program, you use your joystick as a quill. (You can use the keyboard instead, but this is extremely tedious except for fine adjustments to your picture.) After dipping the "pen" into one of four color inkwells, you draw any design by moving it along the screen, using the button to start and stop the flow of ink. As in any graphics program, your success with such a tool depends to a large extent on your own artistic ability and your dexterity with a joystick. Making this feature mouse-driven would obtain better results.

The well-written guide adequately explains the use of the program despite the fact that it is simply descriptive rather than a step-by-step tutorial.

There are some minor deficiencies and inconveniences which could easily be improved. For example, when entering or editing the information for a particular room in the adventure, the number of the room is not displayed on the screen. The Edit Words option, wherein a particular word (or group of words) typed in by the player elicits a certain response, is restricted to only one single room, or all the rooms except one. A given word should be allowed to have the same "power" in as many rooms as you wish. The same thing applies to the Magic Words option.

You cannot give the player the option of examining articles since as soon as the word "Look" is typed in, the game defaults to a description of the room. The vocabulary is limited. The player must type in the exact command that you have programmed in a particular room before being allowed to proceed. It is this limitation of the parser that distinguishes run-of-the-mill adventures from the more enjoyable Infocom types.

On the Apple IIe, the arrow keys can be used for cursor movement when making text entries. This is not mentioned in the program guide which suggests using more inconvenient control characters. Also the Delete key may be used instead of Ctrl-D. Although not intended to have the full power of a word processor, the program is cumbersome when making text entries. Finally, Apple II and II+ users will need 64K to access the graphics feature.

However, the positive attributes of the program outweigh these minor negative comments. For the price, you get your money's worth of enjoyment with *Adventure Master*.

ARCADE MACHINE

Broderbund Software
$59.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Challenge*
Creativity	A	A	*Graphics*
Documentation	A	A	*Value for Money*

The ability to create or customize a fast-action arcade game is beyond the programming abilities of the average Apple II owner. Even with the help of several good texts on the subject, good Assembly language programming skill, and the patience of Job, it is a formidable undertaking. Broderbund comes to the rescue with a new graphics package called *The Arcade Machine*. This program generator designs a type of arcade game known as the shoot-'em-up. A user can design and customize an old classic arcade game like *Galaxian*, or use his imagination to design something new and unique. Best of all, it offers valuable insight into how a game is designed by having you design one yourself.

There are several factors that make this outstanding program an easy and fun one to use. It is entirely menu-driven, requires no programming ability, and displays results immediately. In addition, *The Arcade Machine* offers considerable flexibility in allowing the user to incorporate nearly all of the features he has seen in commercial shoot-'em-up games.

Since designing a game requires attention to a tremendous amount of detail, the author has resorted to the tutorial approach using a working game as an example. The user is encouraged to modify a sample "space invasion"-type game that the program defaults to upon bootup. Although the modification options are nearly endless, they begin with the altering of shapes. There can be as many as twenty-four different enemy shapes on the screen. These shapes are organized in four groups called blocks. Each block consists of six small objects, or three medium-sized objects, or two large objects. In addition, there are shapes for tanks (player controlled ships) and explosions. The menu controls the shape and types of shapes, and displays these in a chart.

Editing of shapes is similar to that used in the author's *The Complete Graphics System*. A series of seven boxes, one each for the seven shifted shapes, is arranged on the screen. Drawing takes place by keyboard cursor control simultaneously on one or more active shapes. Thus, objects can be animated as they move horizontally across the screen by changing one or more of the shapes slightly. *Note:* Animation does not work vertically on the screen using this approach. Shapes can be drawn using any of the six Hi-Res colors. Also, different shapes can be activated for each of the five game levels.

Probably the most enjoyable feature of this program is the path creator, which animates your shapes and then lets you run the game option to watch the results. Ten different paths, each containing 254 instructions, may be programmed. This does not restrict the ten objects to ten paths. Each object is assigned to a particular path, and there are conditional jumps that allow an object on one path to jump to the same position on the next higher numbered path.

The paths are programmed on a screen with a keyboard-controlled crosshair. Each of the objects following a particular path has an initial starting position. These are set later while choosing the level options. Two outer rectangles show screen boundaries, one relative to the other. Each move with the cursor programs the shape to move a set distance at a fixed rate of speed. Both these parameters can be varied initially and during the programming. Shapes can also be instructed to drop a bomb in a particular direction when they reach a set point in their path, or transform to the next higher numbered shape when they reach that point. Additionally, a shape can remain stationary while objects perform up to thirty extra instructions, or they can make a conditional jump based on the position of the player's tank. Insert and delete commands let you edit the path. The commands in the path table can be viewed individually, backwards, or forwards, with the use of the arrow keys.

Game variations can be set with the game options. For instance, a game can be played with either one or two players (two player games cannot have joystick movement). You can also include a time limit, barriers on the bottom that will be eroded when struck, bouncing bombs, random object bombing (an alternative to setting bomb drops while programming the path), and you can have objects explode when they hit the bottom of the screen (useful in a game where you must catch falling objects). Sound effects can also be changed. They can be customized for duration, pitch, and frequency. Scoring point values can be selected for each type object and for each level. Finally, you can position your object at its starting point in the path table. This is extremely important if you are designing a winding path where objects that start in different screen positions follow each other. If objects start their paths at different places in the path table for each level, the game, as you can imagine, will look substantially different on those levels.

An insight into this program's versatility can be had by choosing "Level Options" from the main menu. Several parameter charts are displayed for editing. One includes the values for star movement, speed, density, tank speed, movement limits and accuracy,

missile speed, type, number and drift, and bomb speed and type. These can be adjusted for each of the five levels. Under "Miscellaneous" is another option page that allows you to choose items like smart bombs, steerable missiles, free tanks, and whether or not missiles should stop when they strike a background object with the color "White 1."

Once a game is completely designed and the background and title screens have been created, it can be saved to a data disk. Data for parts of a game can be saved at any time. But once an entire game is completed, you have the option of generating a bootable game disk that does not require *The Arcade Machine* program. Imagine the surprise of your friends when a game is played that is new and different and has your name on the title page.

The documentation is clear and concise. The thirty-eight page booklet explains each of the menu options, and a limited tutorial helps to get the beginner started by re-programming the sample game. Five other example games, which can be loaded from files on the reverse side of the disk, show the versatility of the program.

The wondrous thing about this program is its ease of use and immediate feedback in viewing your creation. Programs can be created piecemeal or carefully planned. They become immediately playable. There is little frustration in designing a game, and although the program is extremely versatile, it produces games of a set type. Don't, however, expect it to be able to generate maze games, or even games that are commercially saleable. Yet with your imagination, it can help create games that are different, fun to play, and best of all, uniquely your own.

MAZE GAME CONSTRUCTION KIT

Data Trek, Inc.
$39.95
48K; Apple II/II+

Overall Rating	B-	N/A	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	C	C+	*Value for Money*

The *Maze Game Construction Kit* allows you to design your own maze game. You can design a number of different mazes to be played in sequence. You can also edit the character shapes in the game and set the individual intelligence of each character. The program allows you to save all of this information to a data disk for later replay.

Editing a maze is a two-step process. First, you need to design (or edit) the maze itself by moving the cursor about the screen with the joystick. Button zero draws or erases line segments. When the cursor moves horizontally, line segments are horizontal. The same applies for vertical lines. By creating borderless mazes, or mazes with holes in the border, you can move off one edge and reappear on the opposite side. Once the maze is designed, you switch the cursor to a crosshair by pressing the space bar. You can then grab such things as one-way tunnels and bonus objects and place them in the maze. You can adjust the starting place for each of the two players and, by filling in sections of the monster cage, determine which direction they exit the cage. The second step is to place dots on the maze floor. Button zero draws and erases the dots. If you make any mistakes, you can always clear the entire maze with one keystroke.

There is a character editor for creating or changing shapes. It is basically a dot editor that you control with a joystick. You can select any of the shapes at the bottom of the screen and edit them. There are three shapes for each of four directions. This allows you to animate them as they move. To make the process simpler, there are commands to rotate—or "flip"—the shapes. When you are finished, you can save them to the lower portion of the screen.

The game editor puts the mazes and character sets together to form a playable game. It allows you to choose which of five mazes you are going to use in your game. There are ten possible games on the disk, and you can choose to modify any one of them. Then you can adjust the game intelligence so that individual monsters are dumb or smart in their ability to track you. You can also adjust the intelligence of the bonus so that it can be extremely hard to catch.

The *Maze Game Construction Kit* is completely menu driven and easy to use. Unfortunately, maze game design isn't as creative in this program as it is in the *Pinball Construction Kit*. The plain graphics are adequate for the package. All in all, if you love maze games, this package is perfect.

PINBALL CONSTRUCTION KIT

Electronic Arts
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A+	N/A	*Challenge*
Creativity	A+	A	*Graphics*
Documentation	B	A+	*Value for Money*

So you have played *Raster Blaster, Midnight Magic,* and *Night Mission,* and you think that they'd be a little more exciting if only the programmer had added another bomber, perhaps another spinner, and a drop target for added scoring potential. Close your eyes and imagine the perfect electronic pinball game. It has two sets of flippers at the bottom, the second pair offset wider above. Lane lights alternate with spinners above a forest of bumpers that give extra action and thousands of points as the ball or balls carom endlessly around the playfield. Drop targets ...

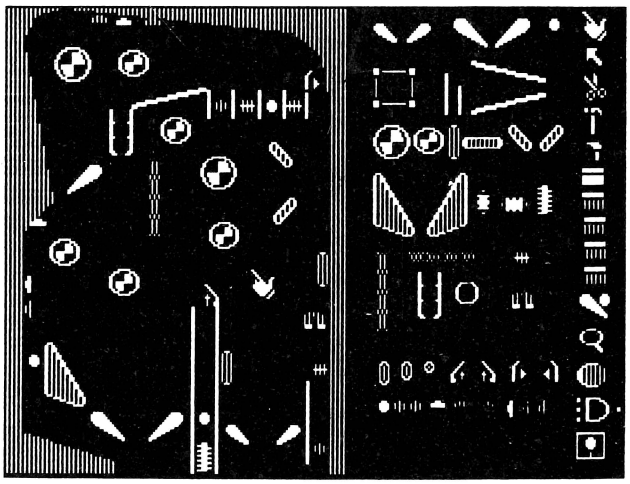
The *Pinball Construction Kit* is a pinball wizard's dream. It allows the user to design a playable pinball machine from a parts box of forty-two components. The parts box, which sits to the right of the designer's playfield, displays all components so that you can select and place any individual one anywhere on the field of play.

Perhaps the best way to describe the ease of this process is with the term "exceptionally human engineered." You can manipulate any of five tools solely with a joystick and one push button. You will use the hand tool most often. By positioning it over the component to be moved and depressing the button you can place the component anywhere on the playfield to the nearest pixel position. If you change your mind, just move it back again, now or later. You can remove parts from the board as easily as place them. You simply move them back to the vicinity of the parts box, and they disappear once you release the hold button.

The first thing you'll need to do is to put some of the basic pinball parts into place. You'll need a ball launcher. It doesn't have to be in its traditional spot; it can be on the left, in the center, or even near the top. Then add a pair of flippers to keep the ball in play. Two different sized flippers can be added either in pairs or singly. You can have two or three pairs of flippers; they all work, no matter where you place them. In fact, all of the parts work no matter how many you place or where.

You have a practically unlimited choice of parts: two sizes of round bumpers and four rectangular ones; kickers and knockers to kick the ball selectively; and two drop target sets to turn on as each of the four parts is struck and then reset. A ball hopper catches balls; it can hold two, and will free all the balls for multi-ball play when it catches a third. There are also lanes and gates to direct balls, rollover lights, a spinner and targets for more scoring, and a magnet that holds on to a ball for a second or two. Last but not least, a ball disintegrator, or hole, eats balls.

The set contains a number of tools to help with the finishing touches. Most pinball games have obstacles to keep the ball within certain boundaries whether on the edge or in the middle of the playfield. You can place a square obstacle anywhere, color it with the paintbrush, and then stretch its shape by dragging the boundary knobs with the painter tool. The hand tool can even move the obstacle about. A polygon with four knobs isn't very useful, so you can add more with the hammer or delete one with the scissors. The entire process is simple, but you must remember to color the polygon while it is still a square shape or you will have a stretched polygon with lots of knobs and no way to fill it in.



No pinball game would be complete without the name scrawled on an empty section of the playfield. A special paintbrush with a magnifier makes it possible to add the fine artistic touches. You can pick a small area to paint on the playfield, then move the joystick controlled paintbrush to the magnified view on the right side of the screen where the parts box used to be. Any of the Hi-Res colors are available, and there is even a grid option.

Of course, pinball pieces come from the parts box with preset values for sound and scoring. You can use the joystick cursor to change these by selecting AND GATE icon. When you select a piece on the playfield, the score and sound are highlighted. You can change these values from the displayed menus. You can also select the conditions to allow a player to score a bonus. Moreover, you can decrease or increase gravity, the ball speed, the kick strength of the bumpers, and the elasticity of the collisions between the balls and the polygon surfaces.

Once you have completely designed a pinball game, one to four players can play with either two paddle buttons or both buttons on a single joystick. You can also save it to another disk in the form of a BRUNable file. You are free to do with the game as you like, which means you can give the game away to your friends, or sell it.

In sum, Bill Budge has created a remarkable program that is well engineered and a delight to use. The *Pinball Construction Kit* can create pinball games of a variety only limited by the user's imagination. Although I've met a considerable number of game players who don't enjoy electronic pinball, the vast majority were totally fascinated with the construction of their own games. The package is reliable in every sense, one of the best designed programs we have ever seen, fun to use, and definitely worth owning.

GRAPHICS

Graphics

Business Graphics

APPLE II BUSINESS GRAPHICS

Apple Computer, Inc.
$175.00
48K; II/II+; 16K RAM card

Overall Rating	A-	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	A-	B+	*Value for Money*

Apple II Business Graphics provides bar charts, line graphs, and pie charts in multiple colors and projects trends based on historic data. It also offers many other features in an easily used format. Once you have booted the program, enter the command Edit. In response to the question mark prompt (?) enter the x,y coordinates (separated by a comma) of the first set points you want plotted. Hit Return and repeat for the following sets. The normal file size holds about 100 points, but you can set a virtual file holding thousands. When you have entered all the points, type End. Decide what type of graph you want and enter your decision. For example, the command Draw Line yields a screen display of a line graph of the points you have entered. Draw Bar yields a bar chart, while Draw Pie yields a pie chart.

Adding labels is just as easy. You can choose from three types of titles: horizontal, vertical, and floating. You must position the floating title exactly where you want it on the screen, using "U" for up, "D" for down, "R" for right, and "L" for left. Hit Return to fix it in position. You can add as many floating titles as you desire. The horizontal and vertical titles appear in predetermined locations, so you need only choose the type and enter your title. The program locates it for you. Now you can save the points, the screen, or both. When you save the points, you also save the horizontal and vertical titles but not the floating titles. When you save the screen, you save the entire screen with all titles, but not the points used as the basis of the graph. If you anticipate modifying your graph in the future, I advise you to save the points.

You can make projections with the five typical curves supplied to fit your graph. The curves include constant, linear, parabolic, logarithmic, and sinusoidal. When you fit one of the curves to your graph, the normalized standard error appears on the screen, indicating the variance between the curve of your graph and the curve selected. The normalized standard error in the ranges indicated have the following meanings:

Normalized Standard Error	Range Meaning
0.00	Exact duplication of your curve
0.00 to 0.30	Very close to your curve
0.30 to 0.50	Significant error
0.50 and greater	Little conformity

Now you can project your graph according to the curve that best fits it.

You can perform dozens of other mathematical manipulations on the data points, including sum, subtract, multiply, divide, add, difference, shift, and distribute. In addition, you can access other program data files, such as *VisiCalc, Apple Plot,* DIF, Apple BASIC, and Apple Pascal files to set up graphs without having to re-enter data. A "Take File" option allows you to set up separate command files. With Take File, you can set up automated slide presentations, animating them by setting up graphs one step at a time for the greatest effect. Like in the main program, you can lay graphs over each other and display multiple bar graphs. With Take File, you can display them automatically, in any sequence, or in predetermined time intervals, or change them manually from the keyboard. Keyboard commands are simple English words, but as you become familiar with the program you can shorten them to two or three character commands by using the Set Prefix command. Then you can use the preassigned prefix character (such as a period) to abbreviate commands.

Although it is easy to use and has numerous attractive features. *Apple II Business Graphics* is not without faults. The worst involves the printer interface. The program supports six different printer/plotters: Apple Silentype, Qume Sprint 5/45, Houston Instruments HIPLOT (DMP 3 or DMP 4), Hewlett Packard HP 7225A and HP 7225B. If you do not have one of these

printers, you must take your program to your dealer and have him perform the miracles of PIK (Printer Interface Kit) on your disks. This copies new printer drives in place of the original on your disk, allowing the program to interface with your specific printer. According to the Apple Hot Line, this support costs an average of $50 depending on the dealer. PIK, also written by Business Professional Software, is available only to dealers. Unfortunately, only half of the dealers I talked to had ever heard of PIK. The others referred me back to Apple.

Other minor drawbacks include the inability to change the size of the graph on some printers, or to position the graph on the printout. Although the program permits you to swap axes, you cannot rotate the graph for printing out.

This copy-protected program comes with two copies of the master program, a tutorial disk, and a blank unformatted disk. I feel the program to be well worth the investment despite the potential printer interface problem. It is one of the most versatile graphics programs available for the Apple II.

CHARTS UNLIMITED

Graphware
$195.00
64K; II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	D	*Value for Money*

Trying to make attractive charts with a commercial graphics package can frustrate you because of their rigidity or difficulty of use, but *Charts Unlimited* proves exceptionally easy to use, aided by clear and concise documentation. You create charts on a worksheet measuring 123 columns by 90 rows (the screen displays 40 columns by 20 rows at a time). Most entries require single keystrokes logically connected to the first letters of the commands. Moreover, the program demonstrates good internal consistency; you do not use the same key in different parts of the program for different purposes.

The familiar I, J, K, and M keys move the cursor, while the arrow keys enable you to toggle between screens (a nice feature, but confusing). You can draw shapes freehand or call upon fixed shapes, easily increasing or decreasing the size of the shapes you have created. You cannot use any peripheral control, such as a joystick or graphics tablet.

Available options include an erase mode and a limited text mode that contains only small and large fonts (it could use more). You can define and add additional shapes for storage. The program supports a large number of printers and interface cards, but it does not allow the use of the capabilities of special function graphics interface cards such as the *Grappler+* or *Microbuffer II*. You may need to change the DIP switches for some printers. Unfortunately, copy protection of the program makes the modification of printer dump routines difficult, although the vendor was exceptionally helpful in response to problems I encountered during printer configuration. In addition, you cannot use printer dump cards or printer dump software.

This program has a major limitation: the use of a format other than the standard Hi-Res format. This makes it difficult to transfer material among other programs and *Charts Unlimited*, such as data from spreadsheets or statistics programs for use in your charts. The nonstandard format without a conversion module makes these functions impossible.

Charts Unlimited produces professional looking charts for business use via keyboard commands. Better printer interfacing and provisions for conversion of charts to standard Hi-Res format would much improve the program. At $195, *Charts Unlimited* is overpriced for what it delivers.

DATA PLOT

Muse
$59.95
48K; II/II+/IIe/IIc

Overall Rating	C+	B	*Reliability*
Ease of Use	C	B-	*Error Handling*
Documentation	B-	B	*Value for Money*

Data Plot is a graph plotting program that allows you to display numeric data as either bar charts, line graphs, scatter diagrams or pie charts. It allows you to enter, edit and save the data tables for plotting and display at a later time. It also supports hard-copy for either the Apple Silentype or Trendcom 200 line printers.

Data Plot allows up to 90 points to be plotted on all but the pie chart, which only supports a maximum of 25 points. The program automatically scales the charts for the user, but this feature can be disabled. Multiple charts are allowed and labels in addition to your axis labeling may be added to give your charts a finished look. However, these extra labels can't be saved as part of your data file, but can be saved as a finished Hi-Res picture.

The program also offers a statistical package. A simple keypress will show the menu and standard deviation of the data points on your bar charts, scatter diagrams and line graphs. Likewise, percentages are given for the slices in your pie charts.

The program comes on a protectd 3.2 disk. Muse's protection scheme also produces a protected data disk. This precludes interfacing directly with the data files from any other program like *VisiCalc*. However, one can enter the data by hand. Another problem involves using a printer other than the two mentioned above. Although it may be possible to use Ctrl-C to get out of the program, then type in a driver program in hex and save it to the protected disk, Muse doesn't specify how.

The program is quite comparable to Apple Plot. Its editor is easier to use than Apple's and has the added feature of statistical computations. However, as mentioned above, it is restricted in interfacing directly to other program's data files.

GRAPH'N'CALC

Haba Systems, Inc.
$117.00
128K; III; Hard disk recommended

Overall Rating	B	A-	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	B	B	*Value for Money*

Graph'n'Calc, a business graphics system for the Apple III, is written (for the most part) in Business BASIC. It's not copy-protected, so you can make backups or run it from a hard disk. In fact, the manufacturer plainly encourages you to back up your program and run it from a hard disk. The program even contains spaces for you to write your own Business BASIC routines for customized computations; you can run these modules from within the program.

The program performs all operations on the table of values displayed on the upper part of your screen. The lower part of the screen behaves as a "scratch pad" for you to answer questions, set parameters, and perform calculations. The middle part of the screen lists your command options at any given time. If you don't want to hand enter data, the program will read your data from DIF files (as long as they conform to the program's expectations of what kind of data goes where). Upon booting, the program attempts to load the last data file used. If this isn't available, you get an empty array.

The program has certain hardware limitations. If you want to print your graphs, for example, you can use only the Apple DMP or Epson MX80/100 printers. You can work around these limitations, however. If you have another printer connected via a PKASO interface, you can save your plot to disk (which creates a Fotofile). Now you exit *Graph'n'Calc* and run your picture dumping program. While inconvenient, this method does work and allows you to modify the plots with another program if you wish. *Graph'n'Calc* generates plots, including line charts, bar charts (both stacked and grouped), combination line and bar charts, and pie charts. You can even create a "slide show" of up to twenty saved plots.

Haba Systems now publishes *Graph'n'Calc*, but Marton, Inc. developed the program and Desktop Computer Software originally published it. It's a fairly new product for Haba and consequently their support, although better than that of many other companies, isn't quite what it should be. Marton wrote the manual, which shows great attention to detail. The author organized the material well, indexed it carefully, and provided a table of contents for each chapter, as well as the main table of contents at the beginning. The examples are good, but scarce.

The calculator mode allows you to enter data from the keyboard or the array of values that you work with. When you ask the program to fit a curve, you specify whether you want a linear, exponential, or geometric fit. You can also request a least squares linear regression analysis. The program also carries out standard statistical functions (range, maximum, minimum, mean, trend, standard deviation, and standard error). Best of all, as I explained above, if you need a computation beyond those supplied, you can write your own module and access it from within the program. Just follow the instructions in the manual.

GRAPHICAL ANALYSIS II

Vernier Software
$24.95
48K; II/II+/IIe/IIc; Applesoft language card

Overall Rating	B	B+	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B	B+	*Value for Money*

A set of programs written in Applesoft that allow you to analyze data graphically, *Graphical Analysis II* has twelve modes of operation, including the ability to merge data sets, rounding off, hard copy printouts, linear regression analysis, modification of data files, axis scaling, and, of course, graphing. A data table may

include up to 200 data pairs. The program permits easy, foolproof data entry (although nothing can make manual entry of 200 data pairs truly easy). The care that has gone into this package means that it isn't easily flustered by unexpected entries. However, when something does go wrong, the error messages flash by too rapidly for comprehension.

You can scale the display of data either automatically or manually and draw the plot with or without connecting lines and a grid. Interestingly, the plotting program can easily change the scale of the axis to powers of the x variable or to semi-log or log-log scales, giving you a quick and powerful way to visualize the possible general relationships between the two sets of variables in a data set.

Graphical Analysis II takes a step in the right direction for a scientific graphics package. It succeeds in its stated, albeit limited, aim as a teaching tool for introducing graphical analysis to beginning college science majors or advanced high school students. However, it does contain some disappointments. For example, even an educational package would benefit from the ability to subtract from a baseline before running the exponential analysis, or to plot several data files simultaneously on a single graph along with their regression fits.

HIGRAPH III

Bausch and Lomb
$25.00
48K; II+/IIe

Overall Rating	C	B-	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C-	B	*Value for Money*

The *Higraph III* plotter program is an enhanced version of *Higraph I* and useful only on Houston Instruments (Bausch & Lomb) plotters. It is a very handy tool; yet, it does have some significant drawbacks. The program is furnished on an unprotected disk for $25.00 or to members of the HI users group as a printed listing for no charge. The nineteen page listing is included with the documentation when the disk is purchased. The token fee for the program is reasonable as it includes the cost of the disk, manual and mailing.

The manual is a looseleaf unbound collection of twenty-six pages. Its purpose is to explain the prompts and this it does in a reasonably clear manner. Unfortunately, several sections require a moderate technical knowledge of the plotter, interface and computer as well as a fundamental knowledge of computerese. The average user will most likely ignore these areas for some time as they discover that the program is nearly self-explanatory.

On the positive side, the program enables you to produce first class graphics on the plotter in a very short time. The package allows you to select from line, bar,and pie charts. The line and bar charts may have multiple lines and bar sequences per graph. Bar and pie charts may be filled solid, partially (pin stripe effect), or unfilled. Pie charts may be solid circles or exploded (separated into distinct wedges). You are asked to enter a title for the graph which is centered in the final product as are your responses to prompts for xand y-axis labels. The program will check that data entered is within the range specified. The prompts for each graph type are clear and easily understood, and all entries are checked for acceptable answers, thereby making the software reasonable foolproof.

A fourth mode, manual, offers some interesting options. In this mode, you can design any custom graphic with a few simple keystrokes. This feature has more possible uses for a design system than a business graphic program, but it is fun to use.

Once a chart or graphic is created, you can display the data to the screen and make corrections as needed. Any entry may be edited if a mistake occurred at the time of entry. The main exception to this correction feature are the titles and labels which may not be corrected at this point. If all the data is correct, plotting is the next step. While plotting, a series of cryptic symbols and numbers appear on the screen. In actuality, these are the commands for the plotter that are echoed to the screen. This can be confusing or at best an annoyance. When plotting is complete, you are asked if you wish to save the data as a disk file. The titles, labels, and data pairs are saved in a standard Apple text file for later recall.

While the program is handy, there are some problems. A series of startup questions concerning the type of interface, slot location and degree of plotter intelligence must be answered each time the program is booted. I would prefer to have this data read from a text file with the option to make changes in the file. Another frustrating aspect of the software is that the program may be broken by a CONTROL C or RESET. This can obviously cause a loss of data. Further, if you have the older *Higraph I* version, the files made with it can not be read by *Higraph III*. Since the file format is not clearly stated, the user cannot use a database or word processor to prepare the text files. Nor can *Higraph* read spreadsheet data files. Possibly, this is because most of these tools already have plotter drivers incorporated into their structure.

Several years ago when I purchased a DMP-7 plotter, *Higraph I* was available. At this time Bausch and Lomb

had a user support group. The group would provide members with free software and answer technical questions. Shortly after joining, I was informed that the group was disbanded. In a letter accompanying the review materials, the company states that this group is now active. I hope that this is true as plotter owners will need the technical support of the manufacturer for software help and programming tips.

I ran tests of this software using an older DMP-7 as well as a newer DM/PLIV plotter. Both gave excellent results on both paper and mylar projection film. While this reflects chiefly on the plotter, software must be available to drive it. The low cost makes this program an excellent value. The chief drawbacks include the need to enter data into this program rather than reading the data from other file formats. The potential of data loss by accidental Control-C or Reset keypresses is unheard of in today's software. The producers would be well advised to include the program with their plotter rather than market it as a separate product. If IBM and CP/M versions are to be released as the manufacturer claims, they will not be competitors for high quality spreadsheet and business graphics programs that support a plotter. Despite these difficulties, the program does offer a quick and easy way to create charts and graphs for a business presentation.

MALIBU GRAPHMASTER

Malibu Softcorp
$99.50
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	B+	B+	*Value for Money*

Malibu Graphmaster (formerly named *Versaplot*) is a flexible, easy to use graph plotting program. The program is menu-driven by single stroke commands. Bar, pie, scatter, and line plots are all available. Three-dimensional bar plots, error plots, and overlay charts are easy to produce with a small amount of planning. Although comparison bar plots are possible, three or more bars cannot be plotted side by side. Shading of bars is easily done in an attractive manner. Labels can be changed or moved about, but the movement is awkward, and labels cannot be rotated. There is no limit to the number of labels (a fact that the manual does not make clear). Two sizes of lettering are available. Also, a second copyable disk provides extra disk storage, a demo program, as well as a slide show routine.

The documentation is attractively packaged in a three ring binder. It is clear in most places and comes with a good index. However, the organization forces you to read a large part of the manual before making graphs with the program. In the long run, this becomes an advantage because information is easy to find when you return to the documentation.

Graphs are stored in a DOS format, which means that you can easily print multiple pictures. The print routine easily allows the input of printer strings. The program accepts DIF files, facilitating interchange with many other programs, and files directly from *Statistics* and *Daisy*. In summary, *Malibu Graphmaster* is a flexible and user-friendly graph plotting program at a reasonable price.

MULTI-GRAPH

Micro Lab
$150.00
48K; II+/IIe

Overall Rating	C-	C	*Reliability*
Ease of Use	B-	D	*Error Handling*
Documentation	C-	C-	*Value for Money*

A data graphing utility program, *Multi-Graph* allows you to enter your data quickly and customize a graph to meet your specifications. It also performs simple and complex mathematical calculations. You can enter data either manually or from Micro Lab's *Data Factory*; the program is compatible with a hard disk drive and up to four floppy disk drives. You choose a line, point, or bar representation of your data, diagramming up to six different groups of data on a line or point graph, or up to four different groups of data on a bar graph. You can also devise titles and labels for every part of your graph. *Multi-Graph* also allows you to view your graph as a partial or full-screen image, with printouts in either normal or large size.

After reading the first few pages of documentation, I inserted the master disk as instructed, but it wouldn't boot. I quickly looked for an error section, but couldn't find one. Finally, I read the small print under Helpful Hints which recommended that you make a copy of the disk *before* using the program. After I made a copy, the program booted without problems, displaying an exceptional sample graph in color. Impressed, I began the installation procedure as instructed. I found very few choices for pre-installed graphic printer card interfaces and no plotter interface option.

A tutorial in the manual introduces you to the system's various features and commands. While working with the Rename function, which allows you to rename groups of data, I found a major error: the feature not only didn't work, it rendered my data useless. A long distance phone call to Micro Lab confirmed the existence of a program bug. They told me to return my master disk to get a new version. Except for this problem, I found the graphics commands easy to understand and use. The novice user can call up onscreen Help menus. I also discovered that previously saved graphs reproduce quickly.

In conclusion, I found *Multi-Graph* inadequate and overpriced compared to other graphic utilities available because of its failure to provide an option to create graphs in color or to provide an interface to any data file other than Micro Lab's own *Data Factory*. Moreover, manual entry of large amounts of data becomes tedious and takes a long time. (Note: Because I did not have a copy of *Data Factory* while reviewing *Multi-Graph*, I do not know how well they integrate.)

pfs: FILE/REPORT/GRAPH (IIe Version)

Software Publishing Corp.
$125.00 each
64K; IIe/IIc

A valuable three-program series of small file management, report, and graphing packages that will greatly aid busy business people. (For a complete review of this software, please see the review in the File Manager section of this book).

SUPERPLOT

EduSoft
$49.95
64K; II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	B+	A-	*Error Handling*
Documentation	B	C-	*Value for Money*

SuperPlot is a graphing program that allows you to plot in x-y coordinates a variety of mathematical functions such as polynomial, trigonometric, logarithmic, and exponential types. Unfortunately, however, unlike its name, the program is not very "super." It contains several desirable features such as the ability to: superimpose (in various colors) several graphs for comparison; zoom in or out on either coordinate axis or both simultaneously; and scroll the function left, right, up or down to display key areas of interest. There are, however, many important features that, for a program of this type, are completely lacking.

For example, although logarithmic and exponential functions are among those that can be selected for plotting, they can only be displayed on linearly, scaled x and y coordinates. Many scientific applications, particularly those where the values of the function and/or its argument vary over several orders of magnitude, require logarithmic scaling of one or both coordinates axes.

Another limitation of the program is its lack of ability to superimpose a grid (typically passing through the tick marks on the axes) on top of the resulting plot. This is very helpful for extracting quantative (as opposed to qualitative) information from the plot. Speaking about tick marks, here again the user has no control over their location—the program automatically selects them.

Another serious deficiency is the inability to specify the granularity of the plot, i.e., the number of data points per graph. For rapidly varying functions, it is essential that the user have this option if the graph is to be meaningful at all. Try plotting the function y = x cos x4 and notice how poor the resolution is in the oscillatory region.

Finally, and perhaps most important of all, the program does not provide for a hard copy output on a printer or plotter, nor does it allow you to save your results to disk. If at least the latter were provided for, you could use an auxiliary screen dump program to get a hard copy output. As it stands, once you are through staring at your plots on the monitor, they are lost forever after you turn off your monitor.

While *SuperPlot* is a simple-to-use program for obtaining a quick, but in many cases crude, graph of a mathematical function, its use as an accurate plotting tool leaves much to be desired.

Drawing

ALPHA PLOT

Beagle Brothers Micro Software
$39.50
48K; II/II+/IIe/IIc

Overall Rating	B+	A-	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	A-	*Value for Money*

Alpha Plot includes two main utilities. The first allows you to create Hi-Res color drawings and charts using keyboard commands (paddles optional). You can easily draw dots, lines, squares, and ellipses; move sections of a picture around; and even merge two Hi-Res pictures. The second lets you type characters onto your Hi-Res picture. You can change the size of the characters, as well as the color if you choose larger than normal text. *Alpha Plot* also includes two other programs. A utility called Scrunch compresses the size of Hi-Res pictures, saving disk space. Hi-Lo Plot converts a Hi-Res picture into Lo-Res or vice versa. Selecting one of the keys from the top row of the keyboard initiates all available commands and suboptions.

You can select the background color and the color with which you want to draw. You can also switch between the full Hi-Res screen and one with four lines of text at the bottom to supply program prompts. Another option lets you plot a grid pattern over your picture as a drawing aid. Although you can only draw on page one, you can swap page one and page two, relocate segments of the picture on page one, or transfer it to page two. You can even merge pictures to create composite scenes.

You draw with three different cursors. The normal, or XO cursor, consists of the origin point (X) and the drawing point (O). When you select this cursor, a line is drawn between the two points. The rubber band cursor differs only in that the projected line displays prior to your drawing it. The No Cursor option does not display the cursor. For example, you can draw boxes and ellipses with the XO cursor to set the boundary. When you select the option twice in a row, the second choice fills in the outline with the color you are using.

In the typing mode you can display upper- and lower-case letters using the Escape key in place of the shift key. The displayed letters print out proportionally, but only take as much space as necessary. You can place text anywhere on the screen, unhindered by Applesoft's twenty-four line spacing. You can also rotate characters sideways or upside-down if you wish.

Apple Tip Book #4 contains the manual for *Alpha Plot*. This booklet holds lots of tips, short programs, and interesting odds and ends. The pages covering this program run through all the options, explaining each function and giving examples where appropriate. A trouble-shooting section alerts you to possible problems and what to do if you encounter them. A card that comes with the disk displays the commands. You unfold the card and place it on top of the Apple, behind the top row of keys, to save you from paging through the manual.

You can't use DOS commands while running *Alpha Plot*. Instead you must exit the program, carry out any DOS commands, and re-run *Alpha Plot*. The typing mode has a glitch: you must hit the Return key before reaching the end of the line or it will wrap around to the beginning and overwrite your already entered text. Although the program will not print out the Hi-Res screen, unless you use Scrunch the files are standard DOS files and you can use your graphics printout routine.

I enjoyed using this graphics utility. I found it easy to create colorful Hi-Res screens and label them using the type feature, and the booklet, handy command chart, and bonus programs just make the program even better.

BLAZING PADDLES

Baudville
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Blazing Paddles is yet another Hi-Res, menu-driven drawing package for the Apple II series of computers. It is pretty complete and works with nearly any input device: joystick, mouse, touchpad, graphics tablet, and even a light pen.

The icon-oriented main menu forms a frame around the user's picture. It vanishes upon selection of any function to give an unobstructed view of the entire drawing area. Hit any key to make it reappear when you need it. The main menu includes clear screen, sketch, spray, lines, dots, oval and box (open or filled), zoom, fill, color (solid and textured), window, shapes, text, and various brush sizes. You can also access the disk and control the printer from this menu.

The window icon gives you a cut and paste function. You can clip any portion of the picture by placing a frame around the area that you want. Once this "window" has been selected, you can paste it or place it anywhere on the screen. You can duplicate the image numerous times. If you make a mistake, you press the second button and the mistake will vanish. This "Undo" feature is applicable to all menu functions.

The program includes ten shape files containing predrawn shapes. These include animals, buildings, game shapes, etc. Once a file has been loaded (ten to twelve shapes), you can browse through it and flip or rotate each shape before transferring it to your drawings.

Text too can be added in both upper- and lowercase. While they use the caps-lock key to toggle it on the IIc and IIe, they resort to an awkward right arrow key for the same function on the II and II+. Five fonts can be loaded; standard or italic (8 pt.), bold (10 and 17 pt.), and large block (17 pt.). Text can be typed anywhere you position the cursor before the action button is pressed.

Blazing Paddles operates in an entirely logical manner. In this regard it is one of the best drawing programs on the market. Novices will have little trouble with this program, even without reading the clear and concise manual. As to features, it offers the majority of drawing functions that others offer. It isn't as slick as several others but it shines in its simplicity.

COLORING SERIES I & II

Koala Technology
$29.95 each
48K; Koala Pad and Koala Painter
Apple II/II+/IIe/IIc

Overall Rating	D+	N/A	*Reliability*
Ease of Use	B	N/A	*Error Handling*
Documentation	C	D	*Value for Money*

Coloring Series I & II supplement the Koala Pad and its Micro Illustrator program. The first series offers a set of twenty-six predrawn geometric designs for you to load and color fill. The three groups of shapes include polygons, tilings, and spirals. A coloring book discusses the types. The second series consists of twenty-eight designs of crystal flowers and snowflakes for you to color fill. They supposedly teach you the concept of patterns, but you never get the chance to create your own. All of the shapes were designed with a separate program that links into the LOGO system. On the whole, neither offers much and they are greatly overpriced.

THE COMPLETE GRAPHICS SYSTEM

Penguin Software
$79.95
48K; II/II+/IIe/IIc/; II w/Applesoft language card; graphics tablet or HiPad optional

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	A	*Value for Money*

This completely revised graphics package combines two previous packages: *The Complete Graphics System II* and *Special Effects*. It's one of the most comprehensive graphics packages on the market and the only one that completely integrates both two-dimensional and three-dimensional graphics. In effect, it allows you to define a three-dimensional object, rotate and view it, and save the resulting image to disk. You can then recall it with the regular drawing package and color fill it or add text if you wish. The system also has a versatile shape editor for standard Applesoft shape tables.

You might want to judge the entire program on the strength of its two-dimensional drawing package. It operates via joystick, keyboard, mouse, Apple graphics tablet, and Houston Instruments HiPad. The

drawing screen displays a coded information line on the bottom. All you really need to know is whether your pen is on or off. The cursor or pen position helps only for extremely accurate drawings. You can toggle between full-screen graphics with the Escape key. The space bar toggles the selection screen. The selection screen allows you to choose color from a large color palette and your drawing mode. Modes include Draw, Lines, Fill, Circle, Arc, Ellipse, Box, and Triangle. A submenu on the left lets you access another menu of ninety-six brush styles. Other options controllable from the drawing page include a choice of 2x, 4x, and 8x magnification of the area immediately surrounding your cursor; thick or thin lines; horizontal or vertical lock; and disk access. You must save screens to another disk if you want to add text to your creation or perform any fancy tricks using the Tricks program.

Special effects include flipping the picture left to right or upside down, mirroring the bottom half on the top or the top half on the bottom, or mirroring the left half on the right or the right on the left. You can also change all the colors in your picture, or take a rectangular section and move it or lay it over another position. This portion of the program uses two separate graphics pages as a buffer. You can also shrink a portion of your picture to one-fourth the size.

The font program adds text to your images. You can choose large or small fonts, even edit the character set. You place type on the screen as destructive, non-destructive, or reverse type (important for the readability of characters). Non-destructive type simply places characters directly over your picture; it isn't always readable. Now, the other modes. The destructive mode puts a black box beneath each character. The reverse mode makes the text color the reverse of the background color. You can position all type to the nearest pixel.

The shape table program helps you create and edit Applesoft shape tables. You can create detailed shapes in both the magnified and unmagnified modes, then view them, rotate them, and scale them. You can then use these shape tables in your simple BASIC programs. You should remember that these aren't the fast, detailed raster shapes used in Machine language arcade games.

The extremely versatile 3-D graphics module allows you to create, view, and manipulate figures. You cannot use these objects in other programs (such as for game design). You can save the objects as Hi-Res pictures and color them later. The easily used graphics editor lets you enter, change, or add points and their associated line segments (e.g., Point 2 to Point 4). You can rotate the three-dimensional objects about the center of any plane, or about any particular point. You can distort any axis or move an individual point independently of the rest of the object. You can scale objects and view them from close up or far away. The program performs line clipping. You can add several smaller objects to one graphics file. A utility allows you to make individual sections of an object and combine them to make a complete three-dimensional picture.

Overall, I found *The Complete Graphics System* an impressive package. Even the sixty page manual has been updated and improved. Beginners can read and follow it easily. You can make backup copies of the disk. If you need a drawing package or any of the other utilities, you'll find this package worthwhile.

DAZZLE DRAW

Broderbund
$59.95
128K; IIe with 80-column card/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Dazzle Draw is a fantastic double-high-resolution drawing program for Apple IIc owners and those who have an Apple IIe equipped with an Extended 80-column card. While I've become jaded after reviewing nearly every graphics package for the Apple, Atari, and Commodore computer systems that use everything from a joystick to graphics tablets and light pens, *Dazzle Draw* definitely stands out in the crowd. Certainly nothing on the Apple rivals it, yet alone produces graphics in sixteen double-high-resolution colors. Perhaps only Gibson's slick *AtariGraphics* light pen program with its pop-up menus comes close, and that is only capable of displaying four colors at a time.

Dazzle Draw uses icons, windows, and pull-down menus just like the Macintosh. Using a mouse, Apple Graphics Tablet, Koala Pad, or joystick as an input device, it creates the illusion of working with a color Mac.

The program divides the display into three sections. The narrow band at the top includes the five pull-down menus and an Undo box. The larger band at the bottom is the tool window, and the center section is your canvas. Since they haven't incorporated a feature to hide these windows, they give you the ability to scroll the canvas vertically so you can see the full screen. This minor inconvenience could have been fixed with perhaps the space bar as a toggle between modes.

You pull down the menus, File, Tools, Edit, and Goodies by moving the cursor over the menu bar, then pressing the button. You simply move the cursor down

the list of menu options until your selection is highlighted, then release the button. For instance, if you select the Paint Brush from the Tools menu, the Paint Brush tool window appears at the bottom of the screen. It lets you choose the brush shape and size, and one of sixteen colors or thirty customizable patterns from a palette. The magnified box on the right indicates the active color or pattern. There is also an exit box that releases you from the mode.

Other tool windows allow you to spray paint (even patterns), flood fill (solids and patterns), draw lines (rays, single, or connecting), shapes (filled or outlined squares and ellipses with different border thicknesses), and zoom magnify a selected area of the screen. Text can even be added. You have a choice of Modern or Serif in three styles (Plain, Bold, Italic). If you make a mistake you can select the Undo function and erase the last operation and only the last one.

Thus mistaken files can easily be rectified if they escape what you thought was a boundary. It is too bad that you can't refill an area like you can with the light pen drawing program on the Atari.

Some of the program's most dazzling effects are produced from the Edit menu. Here you can "capture" specific sections of your drawing and then erase, move or duplicate them. You can even flip the section either horizontally or vertically or invert it. With the Capture and Exchange Colors feature, you can replace one color with another within any section. Perhaps your green tree would look better if it had purple blossoms. If you make the color swap with the Capture window right around the tree, it won't effect the rest of the green in your picture.

The Goodies menu activates features like modify pattern, grid and mirrors. The mirror feature allows you to draw objects that are mirrored in either the opposite half of the screen or in all four sections of the screen. You can even control where the dividing lines are. The view picture mode does remove the menus and windows, but you aren't in the drawing mode at this point.

Of course you can save your picture or print them. The pictures are uncompressed and take up a considerable amount of space. You can save six per disk side. Files can be either saved with standard DOS 3.3 or ProDOS. You can even set up a slide show. You can use nearly every Apple printer capable of printing graphics, but only the Apple Scribe and the Epson JX-80 can print your pictures in color.

Dazzle Draw is simply outstanding. The documentation, a large 35-page booklet, is absolutely clear. Except for a few minor points that it clarifies, you could operate this program entirely by trial and error. The program has certainly incorporated nearly everyone's wish book of features. It is the best graphics program available for the Apple. If you haven't upgraded your Apple to work with double-high resolution graphics, this program will inspire you to do it.

DELTA DRAWING

Spinnaker Software Corporation
$49.95
48K; II+/IIe/IIc

Overall Rating	B-	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	B-	*Value for Money*

Delta Drawing, a form of turtle graphics, makes it easy to construct complex shapes and colored objects with simple commands. Pressing the 1 key stores a figure in memory for later recall; pressing the 1 key again lets you repeat that figure anywhere else, including within another drawing. The 1 through 9 keys help you develop a constantly expanding picture. When you have completed it, you can store the entire picture to disk or print it out with a Grappler board and the proper printer. The built-in Erase function key lets you un-draw each section, a lifesaver when putting the finishing touches on your work. Except for a few Control key moves, most commands are single stroke and are designed so that the key pressed matches a word description, such as "D" for draw, "M" for move, "L" and "R" for left and right, and so on. This makes it easy for even a young artist to remember the correct keys.

The well-written manual details setting up and running the program. The manual asserts that the program aims, among other things, to teach even a pre-schooler colors, patterns, and the step-by-step procedures required to operate a computer. Fast Start cards make a handy supplement to the manual. They serve not only to refresh, but to show some simple programs and a command summary. The command summary describes all possible key combinations—a good reference.

The company advises you to put the program disk back into its envelope after loading the program. I agree, because you get no backup disk nor any information about purchasing a replacement in case of damage to the original. Under these circumstances, it seems wise to take good care of the original.

Because of the way *Delta Drawing* was written, you never see the dreaded error messages appear on the screen. If you press a key that has no function, nothing happens. Contrarily, if you press the wrong key, don't worry—just erase the last command and continue.

DESIGN YOUR OWN HOME - ARCHITECTURE

Avant-Garde Creations
$99.95
48K; Apple II/II+/IIe

Overall Rating	C-	C-	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	C-	C-	*Value for Money*

This graphics program purports to create fast and neat architectural floor plans, saved as picture files and/or dumped to a printer. Three menus guide you through the program, although the first simply determines whether you wish to continue to the second menu or quit. The Menu for Architectural Design offers you twelve options: Go To Main Menu; Draw Floor Plan; Delete Floor Plan; Print Out Floor Plan; See Disk Catalog; Insert Extra Labels; Save Picture to Disk; Get Stored Picture From Disk; Erase Screen; View Screen; Give New Screen Scale; Give New Shape Scale.

The Draw Floor Plan option lies at the heart of the program. You get a blank screen with three lines of text underneath. Game paddles position the cursor (a self-centering joystick proves nearly useless in holding the blinking cursor steady). Other controls are the period, comma, semicolon, less than, colon, slash, and asterisk keys. You can draw a line, change line color, or toggle full screen/mixed screen graphics. While the cursor is blinking, you press ESC and the Return key to access the third menu. With no more than two keys, you can choose from seventy-six different shapes, including bathtubs, stairs, door, toilets, wash bowls, outlets, rectangles, squares, arcs, and circles of various sizes. (This is a good idea, but with distinct flaws which I will discuss later.) Once you have selected the shape you need, you return to the Hi-Res screen. The game paddles allow exact positioning, and pressing the space bar fixes the shape where required. The three lines of text at the bottom of the screen provide a dimension calculator for up-down, left-right, and diagonal measurements as well as angle sizes and their complements.

A number of the other options on the second menu perform the normal DOS functions of deleting, cataloging, saving, and loading files. Others erase the screen and view the screen. Unfortunately, the option for dumping to a printer does not include the program for dumping to printers like the Epson series. You accomplish a dump by hitting CTRL-Reset and running your own software. Another option allows you to insert letters (capitals), numbers, punctuation, feet, inches, degrees, and small "m" for meters. Unfortunately, the size is fixed regardless of the drawing size. The scale option lets you choose a screen scale from one to eight hundred feet horizontally, but the horizontal wall thickness is fixed and thus does not adjust in proportion to the drawing. The shape scale ranges from 0 to 255, but choosing 0 or any scale above 20 makes most objects too large for the screen and the shapes appear as pulsating horizontal and vertical lines. A shape between the 5 and 20 scale size tends to lose its form because of the enlargement.

The excellent reference card that comes with the documentation states the key required, the command associated with it, and a sketch of the shape that should result. The eight-page manual, although it provides the necessary operating information, highly exaggerates the ability of the program. The scale distortions offer a good example. The manual states, "Why draw messy error-prone drawings. . ." yet the exterior wall size remains the same no matter what the screen scale. A screen scale of 100 shows an exterior wall thickness of sixteen inches. Also, if you want to work on a room with a screen scale of 20, fixtures become hardly recognizable. These problems seriously flaw the result when you want accurate, sharp, usable floor plans.

I would also like to note that the author gets a bit testy about the value of the diagonal measurements and angular information provided in the text beneath the graphics: "If this doesn't seem useful and convenient in a floor plan creator system, then you my friend have never built anything." He may be a builder—but the plans provided on the disk for a deck house and a two-story house are inaccurate, illegible, and inefficient. He would never make an architectural draftsman, nor would anyone else using this program.

FLYING COLORS

The Computer Colorworks
$39.95 ($69.95 with print capability)
48K; II+/IIe/IIc; non-centered joystick or graphics tablet

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	A	*Value for Money*

Flying Colors helps you create Hi-Res drawings with either a joystick or a graphics tablet. It has one big advantage: it's easy to use and requires a minimum of effort.

The program's menu overlays the right side of the screen. Functions include draw, line, box, circle, color fill, brush size, clear, disk access, alpha mode, and micro mode. You select one of the options by position-

ing the cursor and pressing button 0 on the joystick. Pressing the other button removes this menu to clear the screen. Button 0 also serves as the brush tip and aborts any function in progress. When you press it after making your selection, it literally turns on the color flow. Any non-centered joystick will suffice, but a graphics tablet is the preferred method of input.

You can choose from a palette of twenty colors, including two whites and two blacks. You must be careful when overlaying colors on the screen. Unpredictable colors sometimes result because of artifacting, a term that describes color effects produced by violet and green lines alternating in columns. Color fill allows you to fill over another solid color, but it won't work if the original color consists of a pattern mix of two separate colors. Try painting over it with another color using a wide brush. You can choose a brush size from ten sizes and shapes available. A diagonal line brush helps you create special effects.

The micro mode allows accurate freehand drawing because it limits cursor movement to a small, outlined portion of the picture. Unlike several other drawing programs, this one doesn't magnify the pixels to allow you to easily and accurately correct minor flaws in your drawing.

The alpha option allows you to place keyboard characters anywhere on the screen. You just move the cursor to where you want to place text, press the button, and start typing. You can position characters anywhere, including between lines or slightly shifted. You end your typing by selecting another menu option.

A small, twenty-three page booklet clearly documents the program. While *Flying Colors* works easily once you have read the instructions, I had some trouble operating some of the features using the "boot and try it" approach. This surprising development leads me to believe that the program isn't quite as simple to use as several others that I've experimented with.

You can save and retrieve created pictures to use in your own programs. The program can even read saved pictures from other graphics packages as long as they were saved as standard DOS files. You can print out pictures only if you purchased the $69.95 program that has a print capability. This basic program won't print out your pictures, but it includes a slide projector program that lets you put sixteen pictures on a disk and show them at intervals ranging from one to ninety-nine seconds. You can even link disks together to get an unlimited number of pictures in your show.

Even children will find this versatile graphics package fairly easy to use. As a whole, it encompasses the majority of features found in other packages, plus the freedom of keyboard commands and a continuous menu display if you want it. Nice.

GIBSON LIGHT PEN

Koala Technology
$250.00
64K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	B	*Value for Money*

The *Gibson Light Pen* is a hand-held pointing device connected to the computer via a cable attached to a custom hardware board in slot #7. It enables you to manipulate or draw images directly on a television screen just by pointing the pen. It is completely analogous to working with a normal pen. You just point and draw to achieve a natural one-to-one ratio of pen movement to screen plot. What could be easier? Or better?

The search for the perfect input device has been going on for years. Graphics tablets and the mouse have become popular recently, on the basis, I believe of their low prices rather than their superiority. After all, $250 for this pen exceeds the price of the various alternatives several times over. It has the advantage of allowing the eye and the hand to work together at the same point on the screen, much as an artist draws. Children in particular find it much easier to draw using the light pen, because they don't have to coordinate the motion on the graphics tablet with that on the screen.

The light pen does have its disadvantages, however. First, your hand eventually becomes tired after you have held it up to the vertically positioned screen for any length of time. If you could mount and tilt some of the smaller monitors so that they could lay horizontally or at a slight angle (like an artist's easel), this would alleviate the problem. The lack of a switch incorporated into the pen's three-eighths of an inch diameter case also annoyed me, because this means that you must always use the keyboard to start or stop activities (using either the space bar or the arrow keys). Second, for a light pen to work properly it must detect a strong light source. This means that you cannot draw on a black screen. Usually you would work on a white background and then invert the screen when finished. When you do this, it also inverts or complements the colors (green to violet, blue to red). Fortunately, you can choose a cursor drawing mode where a small patch of white follows the pen around an otherwise dark screen. Third, a light pen is only as valuable as its software.

The *Gibson Light Pen* comes with four software programs on two disks. Penpainter and Pendesigner are drawing programs. Another program enables you to do twenty-frame animation, while a fourth program

allows you to compose short musical compositions. The latter two programs seem more useful as demonstrations of possible applications that you can create with the light pen's Machine language subroutines than as helpful utilities. A Pentrak reference guide in the back of the eighty-page manual shows all of the commands, useful for both advanced Applesoft and Machine language programmers.

Penpainter is the standard drawing program for the light pen. It features a series of pull-down menus activated when you point the pen at the option bar at the top of the drawing screen.You can then choose the drawing mode you wish to use from among a series of icons. You select freehand drawing, lines, geometric shapes (circle, triangle, parallelograms, squares, three-dimensional boxes), color fill, and the overlaying text mode. Geometric shapes can be outline or solid. You generally use the space bar to anchor a starting point, then again once you've chosen the size of the shape. You select color fill patterns from a supplementary menu, where you can also create your own patterns. Pattern or color fill is automatic once you point to the area of the screen that you want to fill. Since you can only fill areas surrounded by black lines, color is stripped from the picture before the fill. Unfortunately, there doesn't seem to be a way to stop the fill if you accidentally point to the wrong area of the screen—a likely occurrence because color fills immediately, without requiring you to press the space bar.

Penpainter includes a number of useful drawing tools. You can negate the picture (black becomes white, colors become their complements), toggle a grid for making perfect vertical and horizontal lines, and set up a mirror drawing mode for artistic effect. You can choose and center three types of mirror drawing: horizontal, vertical, and four-way. In addition, you can load and save your artistic masterpieces to and from the disk, and print them on many dot matrix printers equipped with graphics options. While Penpainter isn't as full-featured as many competing programs or as slick as Steve Gibson's Atari light pen version, Pendesigner, the second graphics program, contains many of the missing features like a magnify mode, and the ability to copy or move a framed area. This does not mean that you can easily shift from one program to the next, since the first program handles color and the second doesn't.

Pendesigner primarily helps you make high-resolution black and white design layouts, architectural plans, circuit diagrams, graphs, and charts. Besides allowing you to draw lines, boxes, or freehand sketches, the program can integrate into your drawing template images stored on electronic index cards. The Copy Area command can move a specific image like a transistor symbol from the index card displayed at the top half of the screen and place it anywhere on the screen. You can temporarily hide the overlay screen containing the index card and icon menu by pressing the space bar. You can customize your own sets of four index cards or use the eight supplied sets included on the disk. These include electronics, floorplan, landscape, music/math, and flowchart symbols. In addition, a zoom feature allows for very precise editing, letting you toggle individual pixels on or off using the pen. Even the black pixels have a white stripe through them so that the pen can sense their screen position.

While Pendesigner is quite easy to use, the light pen lacks a button, requiring numerous keystrokes of the two arrow keys, or the 1 and 2 number keys, in order to utilize its capabilities.

Penanimator is an animation editor, more useful as an intriguing demonstration rather than as a tool for arcade game design. The problem: the small rastered image at the top of the screen remains in one stationary position. Moreover, the data storage format is not explained. Both of these factors limit any practical use because moving a rastered image horizontally requires seven separate shape tables regardless of the animation. Nevertheless, you can create an image on a magnified grid, move it to one of nineteen other frames, then modify it slightly. When twenty of these slightly different images are cycled through, the differences between one frame and the next produced animation. Shifting images is simple. Choose a frame with the light pen, transfer it to the buffer via the down arrow at the bottom of the screen, choose a destination, then touch the up arrow to transfer the frame to the desired location.

Penmusician, a user-friendly program, allows you to compose a short melody (with a maximum of seventy to seventy-five notes) and play it back. You can save these compositions to disk. I liked its interactive nature, much like *Music Construction Set*, but it has more limited capabilities than that program. Initially, the notes are arranged linearly (all the same note) on three full staffs. You choose the note you wish to modify by pointing the pen, selecting the note type (quarter-note, eighth-note, rest, etc.) at the top of the screen, then moving the note up or down on the staff. You make all selections with the space bar and the note sounds when touched. You can also add sharps and flats to the note. To play back compositions, set the starting and ending points (brackets placed on the screen indicate the points). Penmusician is a nice piece of programming but quite tedious to use. I shouldn't be too critical—it wasn't intended as a serious musical tool.

The eighty-page manual that accompanies the pen includes nearly everything you'd want arranged as a tutorial. The last section consists of a reference guide for programmers who want to incorporate the light pen

into their programs. This section defines each statement and shows Applesoft examples. All of the statements are ampersand-operated and extremely straightforward in structure. It doesn't look like it's difficult to write a light pen program.

Whether or not you buy a light pen remains your personal choice of input devices. I feel the light pen is a natural choice, especially for children, but the price may constitute a drawback for anyone on a tight budget. The software contained in the package is good, but not impressive. I think that people who use templates to produce circuit drawings or floor plans might find some practical use for the software which would justify such an expenditure. However, most people who draw and create simply for pleasure should visit a computer store and test the pen. Many will be pleasantly surprised and will probably opt for the *Gibson Light Pen* as their favorite input device.

GRAPH-ART SYSTEM I

Apollo Software Technology
$34.00
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	B	*Value for Money*

This inexpensive basic drawing program has some drawbacks and some nice touches. In my opinion, all new graphics programs have to compete with the leader, which costs around $60. This program costs substantially less, so you can't really expect as much from it. Just so, but it still packs a lot of value for the money.

You can draw with paddles, joystick, or keyboard. With paddles, the author recommends using the keyboard. This takes a little getting used to, especially since it's very hard to draw curved lines. However, a circle-drawing function makes up for this. The drawing mode provides line, fill, brush, and dot functions. You can draw using combinations of these, but the drawing tools and colors occupy two different menus, which makes it harder to use than if they occupied the same menu. The program offers a choice of fifty-four colors—more than adequate. The line drawing function resembles the best available, but isn't as easy to use as the continuous line drawing supported by programs using graphics tablets. The fill mode colors in the picture quickly and well. The erasing function is also well designed. Another function puts text on a picture, also selected from the menu. It offers three sizes of clear and attractive type which you can place directly over a colored background (it creates its own black background). I found the lettering module easy to use and more attractive than that of other programs. A clever slide routine, also easy to use, enables you to put on a little show of your art.

The documentation is written in endearingly stilted English, but actually ranks with the best for programs in this price range. The documentation does not include a telephone number for the publisher. The program is copy-protected, which means you cannot transfer it for use in other programs. The package includes a small sheet of acetate and some sample drawings which you can trace onto the acetate and place over the screen to provide a template. I thought this a clever idea, particularly for non-artists.

The leading graphics package offers shape mover and animator functions, which makes it a better buy even at the higher price, but if you're looking for an inexepensive and user friendly drawing program well suited to children, *Graph-Art System I* is a fine product. In the right hands, it could produce excellent work, as attested to by the sample pictures drawn by the author.

GRAPHICS WIZARD III

Micro Lab
$100.00
128K; III

Overall Rating	B	A-	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A-	B	*Value for Money*

Graphics Wizard III makes a rather nice attempt to bring some of the functionality of *LisaDraw* or *MacPaint* to the Apple III. Unfortunately, the program doesn't support very many printers: Apple Dot Matrix, C. Itoh, Datasouth, and Epson MX-80. However, you can save your artwork on disk as a FotoFile, which means that you can use another program to print it out if you don't have one of the above printers. *Graphics Wizard* also allows you to create and save new fonts (both text and graphic fonts).

Operationally, I have only one real complaint (except for the printer limitations)—the speed at which the program draws. I just didn't feel as if I were drawing in "real-time."

Many features enhance *Graphics Wizard*, particularly some of the fonts, both graphic and text. A slide show capability lets you store a whole script of commands and a sequence of pictures to create a continuing demo. The clear documentation includes illustrative examples, exactly describing the program's operation. A nice touch while drawing is the ability to move the cursor by a fixed increment (which you set and modify). Of course, you wouldn't need this feature if you could use a graphics tool (joystick, mouse, graphics pad), but it makes your job easier.

I do have a final complaint. I would hardly call the customer support at Micro Lab "support." Perhaps I just got someone in a foul mood, but I'm not altogether convinced that I would want to deal with Micro Lab in the future. Besides, they don't offer a toll-free number, so you pay for the time you spend not getting help.

Graphics Wizard lacks the speed and flexibility of some other programs of this type, but I expect it will mature with newer versions. It would benefit from the mouse capability, as well as support for more printers.

HI-RES ELECTRONIC DESIGN

Avant-Garde Creations
$49.95
48K; II/II+/IIe

Overall Rating	B-	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C-	*Value for Money*

This graphics utility package by Don Fudge allows you to design electronic schematics with your Apple. It requires a 48K Apple with paddles or a joystick; paddles are easier to work with. It is menu-driven and fairly simple to use.

You start out with a blank screen and your choice of ninety-eight different components from which to choose, running literally from A (ammeter) to Z (zener diode). To place a component on the screen, you simply enter the letter code; it appears flashing on the screen. Move it around on the screen with the paddles or joystick. Press the R key and the object rotates ninety degrees. When you have placed the component exactly where you want it, press the space bar to add it to your schematic. You can also draw solid and dotted lines in your choice of colors, create horizontal or vertical labels, and erase portions of the screen. You can use alphabetic or numeric characters in your labels, or symbols such as beta or delta (using Control characters). If you have a printer card that allows screen dumps, you can enter the appropriate control characters from within the program and print out your creation. No graphics dump? Save the schematic to disk and print it out later.

Hi-Res Electronic Design comes on an unprotected disk with an eleven-page manual and a two-sided reference card with all the components on it. I thought the documentation adequate for this type of program, because the best way to become familiar with it is to use it. The disk includes three sample screens which you can load and study. The program itself is well protected against errors. I could not cause it to bomb without pressing Reset. It simply ignores invalid entries, including such things as Control-C.

If you need to create schematics and don't find the size of the Apple Hi-Res screen a limiting factor, then you'll probably like this package. At $49.95, it's priced about the same as most similar software, although perhaps a bit high given its complexity.

KOALA PAD KOALA PAINTER

Koala Technology
$125.00
48K; IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A-	*Value for Money*

A touch tablet input device that plugs into the Apple's paddle port, the *Koala Pad* comes with the *Koala Painter* drawing package. The physical unit measures eight and a half by six and a half by two inches. If placed on a flat table, the drawing surface tilts forward about thirty degrees. The square drawing area measure four and a quarter inches a side—rather small. About one hundred pressure sensitive wires beneath the drawing surface indicate the position of your drawing stylus. You must apply a medium and consistent pressure at all times for the unit to sense the correct position of the stylus.

Obviously, this device has a number of advantages over the traditional joystick or even a light pen. It allows more accurate and natural input than a joystick (but it costs more). Some artists might even find a graphics tablet more natural than a good light pen, but I would debate the point. However, the *Koala Pad* costs less.

The real power of any device lies in the software. The *Koala Painter* is an easy to use, full featured

graphics package based on a menu and pointer system. You need only move the stylus to move the cursor, pressing the button to make the desired selection. The single menu allows you to choose colors from two different sets (solid colors and patterns), eight brush sizes or styles, or three modes: draw, fill, or magnify. The magnify mode greatly magnifies pixels on a small section of the screen. You can easily create geometric shapes in the line draw, frame, and circle modes. For example, in the circle mode you position your center with the stylus, press the button, choose a radius, and confirm that with the button. The program draws the circle for you. The box and disc modes are similar except that the entire shape is color filled. You can also create ray patterns easily; they vary depending on the rotation speed.

Naturally you can save or reload your artistic masterpieces. You can also load any pictures created with other graphics systems as long as they are DOS 3.3 binary files.

Koala Painter is possibly the most easily used drawing package that I have ever encountered. This program doesn't even intimidate beginners with little or no computer experience. The brief instructions cover some of the problems that you might encounter, like stopping or correcting a mistaken color fill. Fortunately, you can refill solid colors, but not checkered ones. You cannot add text to your designs. I did encounter one problem: incorrect instructions on returning to the menu. Supposedly, removing your stylus from the pad and pushing the button returns you to the menu. I found that putting the stylus at the very bottom of the picture and pressing the button accomplishes this, as does the Return key on the keyboard (inconvenient).

The *Koala Pad* seems an excellent input device for a variety of programs, especially the *Music Construction Set* and (naturally enough) other graphics programs. I had only one complaint: if you ease your pressure on the pad, input becomes jumpy because the cursor immediately returns to the top left of the screen. In the drawing mode in a program, you get a line from the last point to the corner. On the whole, I thought the *Koala Pad* an excellent value for the money—a miniature graphics tablet but a step up from a joystick.

PICTURE PERFECT

Mind Play
$54.99
48K; II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	A	D	*Error Handling*
Documentation	C-	C-	*Value for Money*

Picture Perfect is a drawing board for ages four and up. It has extensive features that make it very easy for children to use. However, there are a number of serious drawbacks that you should be warned about.

The program flip flops between the Drawing Selection menu and the drawing board. The Selection menu consists of boxes with descriptive pictures and words for each feature so that even very young children can make their own choices. The features include: Draw, Line, and Lines (representing three different types of line drawings); Points for single dots; Box for all types of squares and rectangles; Text for typing words; Fill for coloring; Picture for a selection of seventy-two pre-drawn pictures whose shapes you can alter and color in; Brushes for five types of shapes that you frequently can place on the drawing board from via your joystick (these include two small filled circles, a short vertical line, a configuration of dots resembling a snow flake, and a five point star).

The Selection menu also has a color section with five color options; blue, orange, white, green, and pink. White is included because the background of all pictures starts out black. Some general utilities are also provided, such as Erase for blacking out very small areas. Clear for wiping your board clean, and Storage for saving and loading your creations. *Picture Perfect* is written on a two-sided disk so you can use the other side for storing your pictures.

Only the Draw and the Brushes features require any freehand skill—which make it particularly versatile for children. They need not be discouraged if they have any problems drawing freehand, since they have plenty of options at their disposal for creating some very elaborate pictures with the features. The picture library is probably the most valuable and enjoyable feature. Not only do you have a lot of pictures from which to choose, but you can make each shape a different size and color. With my kids, this seemed to really heighten their pride and sense of accomplishment, since the pictures have a professional touch to them.

Unfortunately, *Picture Perfect* handles errors so poorly that the child's sense of accomplishment is often negated by the level of frustration. The only mechanism for correcting mistakes is the "Erase" feature. You place a little box over whatever you wish to erase; this method is often disastrous. If you've ever created drawings with a joystick, you know how much the

different cursors move with the slightest touch. Positioning this little box over the exact spot you want to correct is very difficult, to say the least. Most of the time, I wind up erasing some of the acceptable portions along with the mistakes! Sometimes, lost portions can be redrawn, but in most cases they are irretrievable. This drawback was particularly frustrating to my youngest kids who would work hard for fifteen minutes on a lovely picture, and then would virtually ruin their work trying to get rid of a couple of mistakes.

Other disadvantages are also worth mentioning. Drawing on a black background is very inconvenient, unless you want to produce night scenes only. In addition, having to select from only five colors, one of which is white, limited the end results more than I originally thought. The documentation was scant and incomplete, most notably lacking any hints to speed up the trial and error process of learning. Add to the above a list price of $54.99, and you have a package that seems a marginal investment at best.

RAINBOW GRAPHICS

Rainbow Computing
$29.95
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

Here is a way to draw pictures on your computer and never even touch the keyboard. *Rainbow Graphics* lets you draw pictures and a whole lot more. Using a joystick, you are able to choose options from the menu. The options are divided into two groups: pictures and utilities.

Using options from the Picture category, you may draw freehand, draw lines, dots, frames, boxes, circles, and polygons. Color Burst allows you to take a color and either fill in an area (freehand) or sweep across the screen creating many different colors and hues. Color Fill lets you fill in a specific outlined area with a certain color. You may also write labels using one of the five styles. One of the nice features is the ability to zoom in on an area and toggle individual bits of color.

The Utilities menu allows you to do many things such as change pen colors (green, violet, orange, blue, and two whites and two blacks). Also, shape tables may be made, scaled, and rotated. There are even options to make precise shapes and outline shapes.

The disk is copy-protected and cannot be used to store pictures or shape tables. Rainbow Computing does make many services available, such as replacing defective disks for free, replacing damaged disks for $10.00, and providing free updates to registered owners when revisions are due to programming errors.

Rainbow Graphics is similar to Penguin's *Complete Graphics System* except that it does not have a 3-D mode nor as many colors or textures. Even so, *Rainbow Graphics* is a bargain considering its reasonable price.

THE POOR MAN'S GRAPHICS TABLET

Rainbow Computing
$29.95
48K; II/II+/IIe

Overall Rating	B+	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

This is an excellent program if you write programs that require graphic displays. By graphic displays I do not mean bouncing balls and such, but electronic schematics, room layouts, and so forth. You can easily generate these diagrams and implement them into your program with the help of *The Poor Man's Graphics Tablet*.

The documentation is very complete. Written in tutorial form, it takes you through the program step by step. An appendix covers all the commands. The end of each chapter summarizes the commands covered.

When you boot up the program, you have three options. The first option allows you to look at pages of the manual on screen. These "help" files are always available. They enable you to use the program effectively without the manual. The second option, the main part of the program, is the graphics editor. You can generate any kind of drawing and save it as either a shape table or a picture, to be included in your programs. The last option, the color editor, lets you color a black and white picture and save it. Only pictures can be colored however, so to include any colored graphics generated, you must save them and run them as pictures rather than shapes. I do not see this as a limitation. Given the features available with this program, I would say that it will meet the needs of the average programmer just as effectively as a graphics tablet costing fifteen to twenty times as much.

Is *The Poor Man's Graphics Tablet* worth the money? I feel that the average programmer can't get a much better deal.

Screen Dump Generators

AMPERDUMP

Madwest Software
$40.00
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	A	*Value for Money*

The *Amperdump* program for the II+ and IIe provides a hardcopy dump of the Hi-Res graphics display—page one or two—by reading the memory of the Apple and transmitting the image to your printer via the interface card. *Amperdump* can be used either in a menu-driven mode, or directly from an Applesoft program. The *Amperdump* disk is not copy-protected, and thus the utility can be transferred easily to other program disks. At present the program supports the following hardware:

	Printers	Interface Cards
Apple:	Dot Matrix	Supports
C. Itoh:	1500	Most
	8510A/B	Popular
	8600	Cards
Epson:	FX-80	
	MX-80	
	MX-100	
NEC:	PC-8023A-C	
Toshiba:	1340	
	1350	
	1351	

There seem to be at least three situations where a software dump program versus a firmware board must be used to print graphics. First, suppose you are using a protected disk program where the code cannot be modified and the program itself generates graphics. The manufacturer has chosen not to design a printer dump program that will work with every combination of interface card and printer. The author may have thought that such investment of time and money might have adversely affected the price of the program. However, if the program does save the screen graphics to disk, you can dump them to *your* printer through *your* interface card using *your* graphics dump program. Theoretically, you could save the cost of *Amperdump* each time you buy a program where the author chose not to write his own dump routines. Second, you will want to own a graphics dump program if you own one of the non-firmware boards. You may have no other choice for printing graphics other than using a software program. Third, this utility offers many features which are not available in other graphics dump routines, either in software or firmware. In particular, this package offers (depending on your hardware, of course) up to nine different vertical magnifications, i.e., dimensions of your graphics image—0.88″ to 8.0″—and up to seven horizontal magnifications—1.75″ to 7.78″—in any horizontal and vertical combination. The utility can also provide inverse (black on white) and normal (white on black) printing and position the image horizontally on the page. It also solves a minor irritation in using firmware boards: you will see no unsightly Applesoft "Syntax Error" message just below your freshly printed graphics dump.

The program works in two modes: from a menu and from within Applesoft. The menu-driven program lets you choose from all the printing variables available. It also allows you to load the graphics from disk and view them (in Apple full-screen dimensions) before printing. The Applesoft mode of the program is accessed by "&:DUMP" or "CALL 37500" from within your program. You may change dump parameters with modifiers placed within the above statements. The program loads just under DOS in memory and therefore competes for memory space with some Applesoft editor programs and others. However, it gives a warning before loading if HIMEM is not at its normal location. Then, upon loading HIMEM, it is moved from 38400 to 37499. Alternatively, if you require unusual memory allocations, you will find the program relocatable. This is covered in the manual.

As an added point, Madwest Software also markets the program *Ampergraph*, which I have not yet seen. The two programs are claimed to work smoothly together in creating and dumping graphics images from within Applesoft programs.

Amperdump is a very good program. Even the beginner will have no trouble using it. If you do not intend to use its Applesoft capabilities, this program will be very useful in its menu form. The author, however, failed to provide examples of Applesoft uses. For instance, the inexperienced programmer could benefit from a brief sample program on which to practice dumping the graphs. Also, the program lacks one feature which keeps it from totally replacing the firmware graphics dump interface card—there is no provision to print graphics that are rotated ninety degrees on the page. This eliminates any use of the "strip chart" type of output offered by firmware cards.

FRAME-UP

Beagle Brothers Micro Software, Inc.
$29.50
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A	A	*Value for Money*

Frame-Up is a utility which allows the display of text screens, low resolution graphics screens, and high resolution graphics screens in a "slide projector" mode. The features are extensive and include a text screen editor, the manual or timed sequencing of displays, forward or reverse presentation order, and unattended operation. The documentation is excellent, and includes the standard Beagle Brothers booklet plus a slide show tutorial which graphically shows all of the program's main features. The utility is easy to use, and is made even more attractive by the inclusion of a Beagle Brothers keyboard reference chart.

I can imagine no better utility than *Frame-Up* for the Apple user who wants to display a series of text or graphics screens. The combination of ease of use, speed, and capacity make it a good choice for a large range of display applications. High resolution images can be changed in two and one-half seconds, and text frames (or low resolution graphics) can be changed in an amazing one-quarter of a second. This even allows for some limited animation. Seventeen high resolution frames, or 136 text frames, can be stored on one disk; each frame can be programmed to display itself for a given period of time to create text screen tutorials (as is done on the program disk itself).

It is hard to fault *Frame-Up*. The price is low and, as with all Beagle Brothers programs, the disk is not locked. It looks like another winner for the Beagle Brothers.

GRAPHTRIX 1.3

Data Transforms, Inc.
$65.00
48K; II+/IIe; graphics printer

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B-	C	*Value for Money*

Graphtrix is a graphics printer utility package that offers some new features unique to the microcomputer industry. This package is a menu-driven edition that implements Hi-Res screen dumps from either disk or memory (page one or two) and supports all current matrix graphics printers used on the Apple II.

This package specifically can be used with the following printers: Anadex 9000/9001/9500/9591, IDS 440G/445G/460/560, Centronics 739, Epson MX-70/MX-80/MX-100, MPI 88G, and the Silentype. The interface cards that are supported are: Apple Standard Parallel, Apple Centronics Parallel, Epson APL Standard, and the C.C.S.7728. The newest version incorporates support for the SSM AIO, Mountain Computer CPS, and the TYMAC (for Epson) interface cards.

Graphtrix also allows *Applewriter* owners the luxury of placing graphics or pictures in their letter files, as well as inclusion of footnotes either at the bottom of the page or at the end of chapters. There are capabilities (if the particular printer supports them) for using three sizes of magnification, cropping of both top and bottom of screen, superscripting (with limitations) of footnotes, and a utility to quickly shift from one Hi-Res screen to the other. There are appendices for each printer manufacturer which provide information to the programmer for utilizing *Graphtrix* capabilities in BASIC programs.

Error handling is accomplished by using Control-C for halting execution and re-running the program. Not very elegant, but effective nonetheless.

All in all, *Graphtrix* is a most useful utility for the Apple owner who wants to fully utilize the graphics capabilities of his printer. The program is priced right and allows for easy backup, which is a blessing in this age of copy-protected disks.

PRINTOGRAPHER

Roger Wagner Software
$39.95
128K; II/II+/IIe/IIc

Overall Rating	B	B+	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B-	B	*Value for Money*

Printographer is a utility that allows you to print any hi-res screen to virtually any printer equipped with any printer interface card. Images can be printed cropped, magnified, in a diamond or cameo, framed, and either horizontally or vertically on the page. Full color printing on appropriate printers is also supported.

Although image magnification can be up to ninety-nine times, full framed screens can only be magnified three times or they won't fit on the screen. Cropping is easy with this program. Two blinking L-shaped markers indicate the boundaries of the lower right and upper left portions of the screen. They can be activated and moved by either pressing the T or B keys, then either the arrow keys on the IIe or IIc or the I, J, K, and M keys on others. You can zip along faster if you press the Z key.

You can even add text to your picture at this point before saving it or printing it. They have included eight character sets along with the standard ASCII set. The others are always loaded into the alternative set. All computers, including those without a lowercase adapter, can get lowercase with the Control-S upper-lowercase toggle. You can type down the screen, too, if you need to add a vertical label. Also, mistakes can be easily rectified with the Control-O command, which erases the character under the cursor and restores the original.

Hi-res screen can either be stored in standard format or in compressed form. These files, which can save disk space are S-type files, not binary files. They can't be used with other drawing programs.

Horizontal format printed pictures are fine, although very slightly squashed. However, vertical pictures, are noticeable stretched along the horizontal axis. Some daisy-wheel printers are capable of printing graphics with their different sized periods. While this program supports these printers, you had better have a metal wheel rather then a plastic one, or the periods will be banged flat.

ZOOM GRAPHIX

Phoenix Software
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	B-	A	*Value for Money*

Zoom Graphix allows any printer that supports graphics to print out pictures that reside on either Hi-Res screen. It can print an entire screen either vertically or horiziontally, or print a portion of a screen in an expanded form, or in your choice of screen proportions.

The program supports twenty-one printers. All of the Epson, IDS, and Adadex printers are included, as well as the Qume, Diablo, Xerox, Prowriter, NEC PC-8023, MPI 88G, Silentype, Spinwriter, and Starwriter. It will work with twenty interface cards, virtually all that are currently available.

This utility is menu-driven, and it has excellent error trapping features. When a user wishes to print a portion of a picture, he can choose the coordinates of each edge, and the computer will show exactly what will be printed. He can easily change any value, or by hitting Return, simply use the current setting of each boundary. The user can specify the proportions of the width and height relationship of the printing. A picture two dots high by three dots wide is the recommended setting, but one can stretch the width with a five dot wide by two dot high setting, or similarily squash the width with a three dot wide by six dot high setting. The program also incorporates a print delay at the end of each line so that print heads don't overheat when printing pictures with a lot of black areas. Pictures can be inversed if desired. There is no doubt that this is the most versatile of the many Hi-Res screen dump programs that are available for the Apple. The printing is certainly as dense and as dark as that offered by the *Graftrix* package, yet has many additional features.

Shape Tables, Fonts, and Animation

FONTS

Tangent 270
$34.95
48K; II+/IIe

Overall Rating	D+	D	*Reliability*
Ease of Use	D	C-	*Error Handling*
Documentation	C	F	*Value for Money*

Fonts I helps you set up Hi-Res pictures (menus, prompts, Help messages, etc.) using a multitude of character sets. The character sets fall into two classes: occidental type fonts (script, Roman, gothic, Greek) and graphic symbols (math, music, weather, zodiac). You can select your font style, size, and color; slant angle for the writing line; and coordinates of the starting point. Unfortunately, you compose your message a line at a time. The program is extremely slow, cumbersome, and (for the most part) unfriendly. Thus, despite the high graphics quality, the program has limited utility (especially when compared to its competitors). Take note, also, that the program was written for the Apple II+ and has had limited testing on the IIe. I ran it on the IIe and had no problems except for the need to make the appropriate changes in the documentation.

With the exception of two very short Machine language routines (one for reading data files and the other for error handling), the program is written in Applesoft. One of the two disks that come in the package holds the twenty-one fonts available, storing them as a database of coordinates rather than as Hi-Res pictures. This means that each time you call up an individual font character, the program must draw it again—and at very slow speed. For example, one of the demo options displays all the characters in a selected font. It took about forty seconds just to load the font from disk, and twelve minutes to create the Hi-Res picture. Another limitation: you cannot edit the characters. Also, you cannot send output to a plotter or dump the Hi-Res screen. Of course, you can get around this by generating a plot file of the coordinate points in the message or font and read the plot file with a plotting program, or by using one of the many fine screen dump programs on the market.

The program runs with two disk drives, but you can modify it by changing a single Applesoft statement to work with one disk drive. I don't recommend doing this because of the prohibitive number of swaps between two disks just to load and display a particular type font.

As previously mentioned, you can create and display a one line message. If you choose the default values that first appear on the submenu, the program hangs up. (The manufacturer suggested a programming fix for this problem.) When you complete one line, the program changes the default values to the horizontal and vertical positions at which you left off. If you want to erase all or part of the message (accomplished by writing the same message in the opposite color), you must remember the starting coordinates of the last message. Extremely inconvenient. An exception occurs when you select a new type font, in which case the defaults return to the values they had prior to the last message. I see no logical reason for this inconsistency.

Each character in the symbol fonts has an ASCII decimal number assigned to it for selection. Thus, you must have an ASCII-to-keyboard conversion chart to use the program effectively. Also, the program doesn't display any ASCII numbers corresponding to keyboard control characters in the Message Variables option, which means you must write down what you type. To write a message with ASCII numbers corresponding to non-keyboard characters, you must resort to modifying the Applesoft statement that writes that message.

You cannot readily see the messages you have already written and displayed on the screen when selecting your choices for the next message. Why not include a toggle to display the Hi-Res screen? Also, the characters don't always look exactly the same, which is disconcerting.

A program of this type should allow you to work with the font in either a word processing mode or a program control mode, with such niceties as automatic centering, easy rotation and positioning, inversing, and

so forth. In either mode, storing the font characters as Hi-Res pictures is a marked advantage. Given all the problems with *Fonts I*, I just can't recommend it.

GRAPHICS MAGICIAN

Penguin Software
$59.95
48K; II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	A	*Value for Money*

The *Graphics Magician* is an outstanding and creative graphics package written by three gifted programmers, Mark Pelczarski, Chris Jochumson, and David Lubar. They combined their expertise to produce a series of editors and machine language routines that will allow the intermediate BASIC language programmer to produce arcade style animation in his games or Hi-Res drawings for use in his adventure games. The philosophy is to have the users treat the graphics routines as mysterious black boxes that can be controlled by several input parameters from a BASIC program. A minimum of explanation is provided to aid the user in his choice of which black box might work best.

There are three main parts to this package. The first is the animation package. This consists of three editors: the shape editor, the path editor, and the animation editor. The shape editor allows you to create a set of seven shifting shapes that if moved across the screen horizontally would produce very smooth animation. When shapes are drawn using the I, J, K and M keys for cursor movement and other keys for locking and unlocking the plot and erase modes, seven shape tables are generated on the screen simultaneously. Any one or several at once can be drawn independent of the rest of the shapes. Therefore, the motion of a man walking could be drawn in seven stages. The body and head would be drawn first for all seven shapes, then the arms and legs independent for each frame. These shapes can be in color if color rules are followed in what is an every other column color-alternation on the Apple's Hi-Res screen. Shapes are then compiled into bit-mapped shape tables, and if the user wishes he can then watch his animated shape as it moves across the bottom of the screen.

Once you have created a shape, you use the path editor to tell it how to move on the screen. Eight keys decide the direction, and the size of the move can be as large as three units in any one direction. Since each direction move uses one memory byte, a long and complicated path could use a lot of memory, especially if you are planning several dozen shapes in your game.

The animation editor allows you to combine as many as 32 shapes with their associated paths. You can specify the starting coordinates for each shape and can use the same shape a number of times. There are other options that will allow you to stop an object or erase it from the screen when its animation cycle is over, or loop back and continue another cycle. Also, the user can preview the animation before saving it to the disk.

The picture/object editor allows you to create colored pictures and objects in a form that takes amazingly little space in memory or on the disk. While pictures normally require 34 disk sectors, the average space required is only 2 or 3 sectors, and a very complex picture only 5 sectors. These pictures can be used from your program using a BLOAD, two POKEs, and a CALL.

Each move that creates your picture requires memory. A byte counter is displayed at the bottom of the screen. A line can be drawn in your choice of color by setting a start point with paddle button one, then drawing that line to another point by pressing button 0. The user can choose any of 108 colors from a palette of colors and fill in any closed boundary with that color. Of course, most of these colors are checkerboard combinations of the six primary Apple colors. It is often best to use a non-spring loaded joystick when positioning your cursor. And more accurate control is offered allowing more controllable motion over a narrower range. The program also incorporates an editor that will allow you to step through your drawing procedure. Thus, mistakes can be corrected or instructions added and deleted without having to start over.

The third part of the package allows you to create super shapes which are very similar to Apple shape tables but with added features. Since scale and color can be changed in the middle of your shape, large shapes can be condensed in memory by using a larger scale. You must realize that using this procedure is much slower than using bit-mapped shapes developed in the first section of this graphics package.

THE GRAPHICS SOLUTION

Accent Software
$149.95
64K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	A-	B	*Value for Money*

The Graphics Solution is a sophisticated and powerful animation package that is useful for creating business and educational presentations when animation is needed to enhance or to hold the viewer's attention. It essentially lets you animate multiple-colored shape tables combined with text on the screen on a frame-by-frame basis.

Because a powerful package like *The Graphics Solution* requires a great deal of practice for the user to become familiar with all of its features, the package comes with an extensive tutorial. The tutorial is divided into eight lessons, each lasting about fifteen minutes to half an hour.

The program is very straightforward to use. The main shape editing is done in a Lo-Res mode, then transferred to a point that you choose on the Hi-Res screen. The A, D, W, and X keys, which are set in a cross, move the cursor. Depending on the mode, the cursor will move, draw, or erase the enlarged pixels. Pressing the "H" key transfers you to the Hi-Res screen where those same cursor keys move the shape around. The "P" key will transfer the Lo-Res shape to the Hi-Res screen. Multiple copies can be made. The background surrounding the shape will be retained; conversely, it is also possible to take sections of the background screen and transfer it to the enlarged Lo-Res window. Sections can be modified and either replaced or moved elsewhere. Any of these window shapes can be saved to memory and recalled when needed.

The program does have a "macro" command feature. Any series of up to 256 commands can be defined as a macro. This allows you to execute all of those commands repeatedly by pressing only one key. While this is useful, only one macro can be stored at a time.

The real power of *The Graphics Solution* lies in its ability to take snapshots of the Hi-Res screen and put a series of these "frames" together to form an animated movie. The screen is saved just by hitting the Control-Z keys. The show mode lets you view your movie just by pressing the "M" key. The movie can be stopped at any time and single-framed either backwards or forwards. Since the projection speed affects the rate of animation, the speed can be set for either portions of the show or for the entire show. Once you have verified that everything is correct, it can be saved to disk. These movie presentations can be interfaced to run from your BASIC programs. There are sufficient examples in the manual to help you do this, but they are generally difficult to follow from the standpoint of the novice programmer.

Shapes are generally moved horizontally in jumps of seven pixels. In order to smooth the animation, entire shapes smaller than the Lo-Res window can be scrolled horizontally. Vertical scrolling is also possible, as is the possibility of creating mirrored shapes. The editor also features elongation and compression commands. This is helpful since the Lo-Res shapes appear compressed horizontally when viewed in Hi-Res.

You can also add text. While text is normally static, animation is possible by capturing the letters in the Hi-Res window and using them as shapes. The text is an improved version of the standard Apple character set.

While this graphics package is very powerful for creating stunning animated visual presentations, that is its only use. Games can't be designed with it since collisions aren't implemented and interactive paddle control is not possible. With practice, *The Graphics Solution* will produce good animated presentations. Practice is the key word for this package, which requires a lot of your time and effort. Those who master it, however, will be pleasantly surprised at the results.

THE GRAPHICS SOLUTION EXPANSION MODULES

Accent Software
First Module Free with Purchase of
The Graphics Solution; Second Module $35.00
48K; Apple II/II+/IIe/IIc
Gibson Light Pen or Koala Pad

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Accent Software has taken an already excellent animation utility for the Apple and made it even better, adding two new expansion modules. One allows use of the Gibson Light Pen to create the shapes necessary for animation. The other uses the Koala Pad for the same purpose.

The Gibson Light Pen, clearly one of the most innovative additions for the Apple, allows you to draw directly on the screen. It also selects various menu options directly from the screen. It provides an extremely powerful graphics and user interface tool. The

Koala Pad functions a little like a joystick, but is much more useful. It consists of a touch pad and a couple of buttons that help you move the cursor around the screen. It also provides drawing and selection capabilities. Together, the two constitute the most popular user interface additions to the Apple. It seems only fitting that a program as advanced as *The Graphics Solution* should take full advantage of the advances they offer in user interface technology. Which module you buy depends on which interface you prefer to use with your Apple.

If you read the review on *The Graphics Solution* you have probably guessed that introducing either of these two interfaces requires more program than the Apple can swallow in one bite. This means some disk loading when you want to switch between the module that makes shapes and the module that makes them move. This slight inconvenience is more than compensated for by the advantages the two expansion modules offer:

- Use of expanded Hi-Res to make shape tables, instead of the misproportioned Lo-Res of the base package.
- While drawing on the expanded Hi-Res screen, you also create a true size version of the shape in the upper right corner of the screen. No need to flip between screens to view your creation.
- Menu selection of the drawing mode right from the screen rather than using the keyboard controlled cursor selection method.
- A method called "true-scale drawing" enables you to employ the power of the Gibson Light Pen or the Koala Pad to create backgrounds for an animation sequence.
- The ease of using either tool to create shapes.

Please remember that animation is not possible without the original *Graphics Solution* module—this is an expansion module only, not a complete system. Also, make sure to buy the expansion module that fits your choice—the Gibson Light Pen or the Koala Pad.

PIXIT

Baudville
$49.95
48K; Apple II/II+/IIe/IIc; Koala Pad optional

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Pixit is billed as a "word processor for Apple shape tables." It is that and more. Apple shape tables aren't easy to master. Many a youngster (and his or her parent) has become lost in the wilderness of drawing and xdrawing, rotation and scale, not to mention vector plotting. Despite the difficulty, mastering shape tables opens up a world of Hi-Res drawing and animation.

The copyable program comes in an attractive little folder with a thirty-eight-page manual filled with facts, plus an addendum to cover improvements in version 3.2. *Pixit* stands in pleasant contrast to other inexpensive graphics programs, not famous for their documentation. The little book contains a table of contents, tutorial, reference section, list of error messages, a suggested reading list, and instructions from the author, Michael Darooge, for copying the disk. His trust earns him extra points in a review of a program meant at least partly for children (not that adults are any more careful). You don't get nearly as much in many programs costing a lot more. The manual also encourages you to list and study the various routines, most of which are written in Applesoft.

Upon loading, the program presents a menu of four choices: the Picture Editor; Create-a-Shape; the Shape Table Editor; and Quit, which enables you to access some additional utilities. Onscreen prompts make it easy to move through the options. After one time through with the manual, you'll be off on your own. Pressing the ? key calls up a Help menu with descriptions of every function.

The Picture Editor lets you load a pre-drawn shape table (a collection of Hi-Res pictures). You can load one of your own tables or one created by the author. Once you select a shape, you can move it around using the designated cursor keys (one set for quick moves and one for slow). Pressing the "P" key and Return plants the picture where you've placed it. You can scroll through all the pictures in one table or pick another. You can then draw in freehand using either the cursor keys, a joystick, or the Koala pad. Then you can color in your line drawing using an efficient fill routine and twenty-four colors. You can change your mind if you don't like the result. After you've finished your picture, you can easily add text in any of five attractive fonts.

Create-a-Shape lets you add your own Hi-Res shapes to the library of shapes. You can magnify the shapes from one to seven times, which allows great detail. You draw using designated cursor keys, which takes a little practice. Other keys let you back up and make corrections. After drawing the picture, another option displays the finished picture and compiles it. You need only fill in the name and save the picture to disk. A function called Shape Sourceror lets you examine any shapes in the program. This excellent learning tool shows you how to execute shapes. You can also edit them.

The Shape Table Editor lets you build your own shape tables or collections of pictures, up to 128 shapes into one table which you can then access from the Picture Editor or other programs. You can put your pictures with the ones from the program. This editor is well-designed, extremely flexible, and easy to use.

A slide-show function lets you put up to ten pictures together into one show, or you can print them out. A graphics dump produces a full page printout. A routine on the program disk lets you configure the Picture Editor for a variety of printer/interface combinations. And the program supports color printers. I managed to print very well using a rather uncommon combination of a Mannesmann Tally Spirit printer and a Graphmax card.

The program ran perfectly. Halfway through my review, I received a new disk from the publisher, with a note saying that they'd found a bug in the version originally sent to me. Well, I never found it, but I certainly appreciated the policy. Even though this excellent program faces tough competition, it's well worth the price and offers features that other programs do not. For one thing, the finished pictures you can create (using even the ready-made shapes) far surpass those you can create from scratch. This program really isn't just another amusing package—it's a learning experience as well.

THE SHAPE MAGICIAN

Dynacomp, Inc.
$29.95
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	C+	*Value for Money*

The Shape Magician is a graphics utility program that facilitates the construction of shape tables. While there are many commercial packages that do this, *The Shape Magician* has some advantages as well as some limitations over others.

The author has defined a grid, an oversized plot pad twenty-five units per side, for accuracy in plotting a shape. You can move the cursor plotting or not plotting in any direction using simple keystrokes. Mistakes can be corrected by backtracking through as many vectors as you wish with an asterisk keystroke. The program's algorithm allows you to travel upwards in the nonphoto mode without regard to the rule that you can only move two spaces without moving sideways before continuing. At the same time that you plot on this five times scale grid, a normal sized shape is displayed on the upper right hand portion of the screen. The number of bytes used is on the lower right. The program limits you to thirty shapes per table and each shape cannot exceed 150 bytes or 300 vectors. Of course, you are limited to a shape twenty-five units by twenty-five units.

The program has an editor, but this editor isn't suitable for constructing a new table, just for redrawing a shape or adding new shapes. The feature for redrawing a shape comes in handy because it leaves you with the cursor exactly as you ended and you can use the asterisk key to backtrack to correct your shape. You can erase the shape completely and start over.

The program is very handy for constructing complicated yet accurate shapes that you have plotted out on graph paper. Its documentation and screen layout are very clear.

TAKE 1

Baudville Corp.
$59.95
48K; II/IIe

Overall Rating	B+	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	B	*Value for Money*

Have you ever had the desire to produce and direct your own animated cartoon movie, but don't have the right connections in Hollywood? *Take 1* lets you accomplish this feat in the comfort of your own home, in front of your Apple II. Actors formed by cutting out snapshots from a hi-res picture are used together with a background picture to form a series of Frames, each containing one of the snapshots displayed against the background. Each Frame may also contain Text, Sounds, and Pauses. A sequence of frames having a common background is then put together to form a Scene. Finally, a group of scenes spliced together with fade-ins and fade-outs as used in professional films forms the Movie.

All of the above steps in the movie-making process are carried out with simple single-keystroke commands from well-designed menus. The main menu consists of the following selections: Pictures & Backgrounds (a hi-res picture editor for creating and editing pictures for use as backgrounds or actors); Actors & Actions (a program for creating and editing actors from snapshots clipped from a picture and defining actions for them to carry out); Scene Editor (an editor for creating frames from the actors and linking them

together to form a scene); Movie Editor (the "cutting room" where the various scenes created in the Scene Editor are spliced together to form the movie); Movie Projector (the place where the movies are played back for viewing, either on an individual run or continuous re-run basis); and Disk Utilities (a set of convenient utilities including a means for formatting blank data disks on which you can store the Actors, Actions, Scenes, and so on that you've created).

Two disk drives are more convenient since the data disk can reside in Drive 2 while the *Take 1* program disk remains in Drive 1. However, the program can be used with a single drive appropriately swapping between the two disks when necessary.

An extremely well-done, illustrated manual accompanies the software. You will find it indispensable while familiarizing yourself with the various facets of the program. The documentation takes you through a series of examples to a point where you can go off on your own and let your creativity run wild.

Although the single program disk has some stored pictures from which snapshots can be extracted for actor creation, you are mostly left to your own devices to create pictures pertinent to the application at hand. In this respect, other Baudville programs, such as *Blazing Paddles* and *Pixit* are very helpful. Alternately, you can purchase Baudville's *Animation Libraries* and *Shape and Font Libraries*, which reduce the need to rely solely on one's own imagination.

To summarize, the program does all that it is advertised to do—and does it well. The closest competition, a program that is quite similar to this one, is Accent Software's *The Graphic Solution*. Rather than compare the two, suffice it to say that they are both excellent programs for creating animated sequences on your Apple; you would not go wrong buying either one of them.

TYPEFACES

Beagle Brothers Micro Software
$20.00
48K; II/II+/IIe/IIc; *Apple Mechanic*

Overall Rating	A	N/A	*Reliability*
Ease of Use	N/A	N/A	*Error Handling*
Documentation	A	B	*Value for Money*

The odd report card above results from the nature of the program: *Typefaces* is a resource disk for the Shape Editor and Font Editor sections of *Apple Mechanic* (also by Beagle Brothers). It adds an additional twenty-six type fonts to those provided in *Apple Mechanic* (a font being a collection of alphabetic, numeric, and special characters all in one style). I thought the fonts both attractive and useful. The disk also offers a bonus in the form of Beagle Menu, a program that allows you to select which types of program to display in a catalog and gives you one-key Run and Load commands for a program. If you don't wish to display binary or text files, simply change line 100 of Beagle Menu and poof! they disappear. Then you might save Beagle Menu as Cat and type Runcat. Once your catalog appears, move the cursor to the desired program and type "R" to Run or "L" to Load and you're up and running.

If you need more type styles for *Apple Mechanic* and would like a nice catalog program for your work, you'll find *Typefaces* a good deal.

Three-Dimensional

APPLE WORLD

United Software of America
$59.95
48K; II/II+/IIe/IIc

Overall Rating	C+	A-	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	C	*Value for Money*

Apple World is a three-dimensional graphics package especially useful in architectural design and for animation. The package is capable of showing three-dimensional objects in a predetermined series of moves specified in advance by the user. The boundaries of this system is a cube about 64,000 units on a side.

The program is relatively easy to use. For one thing, it virtually has a text editor for entering data, which makes that process quite simple. Moreover, the program avoids forcing you to understand any technical aspects.

Data is entered by specifying a start point for the object in X, Y, and Z coordinates, then a point to continue that line in relationship to the previous point (for example, +100X, -10Y). Once an object is completed and entered, one can view it by specifying a scale, a viewing position, plus angles (both horizontal and vertical) to point the viewfinder at the object.

Created objects can be saved for later animation or can be used as basic building blocks for more complicated objects (e.g., chairs in a conference room). One can also save at any time the current view on the screen.

Apple World's main disadvantages are that the program lacks real-time interactive control such as an interface with the PDL input-output for game animation and, as the number of projected lines increases, the animation speed bogs down (speed is approx. 100 lines or points/sec.).

A2-GE1 GRAPHICS EDITOR

subLOGIC Communications Corp.
$34.95
48K; II/II+

Overall Rating	B	B	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	B+	B+	*Value for Money*

A2-GE1 Graphics Editor is a utility package for creating and manipulating three-dimensional databases that use the *A2-3D1/A2-3D2* graphics packages. It includes an *Object Editor* program, a *Motion Programmer*, and a *Slide Show Programmer*. The latter two take previously created objects and scenes, manipulate them, and later play them back as either movies or slides. Also included in the package is a BASIC interface which illustrates how you can control an *A2-3D1/A2-3D2* database from a BASIC control program.

The *Object Editor* is an interactive editor that allows users to construct three-dimensional databases while viewing them. The user controls a cursor that moves in three-dimensional space on the Hi-Res screen. Four lines of text at the bottom give the cursor's current coordinates and the type ofdatabase command entered. The user can position the cursor, continue point, or ray. The cursor is moved using the X, Y, and Z keys, and is decremented or incremented from its last position. Likewise, the location of the user's eye can be changed by first toggling into the eye mode, then incrementing or decrementing the eye's position. All mistakes in the database can be corrected by scrolling backwards through the database using the arrow keys. One must be careful to change the proper data point, or the entire database could be lost, requiring data to be reentered from the initial processing phase.

The *Object Editor*, while easy to use for people who have trouble visualizing three dimensional objects, has several drawbacks. It is not suitable for entering large, predefined databases. Nor does it have delete or insert capabilities, and it is unable to use the *A2-3D2*'s powerful commands such as independent object call, page

switching, or array generation, to produce a smoother, flicker-free picture. It does, however, use the color features, and can set the resolution of the picture.

The *Motion Programmer* allows one to load up to six object data files and manipulate them, each independently of the others. This is accomplished through the independent object call feature of *A2-3D2*. One object must remain stationary, but the others may be given arbitrary velocities and rotations along the axes. This is done interactively as you view the objects, and thus is great fun. Assuming you mastered control of all the objects, the motion recorder feature of the program can be turned on. This will record the entire session much like a video recorder, and can be played back later using the MPLAY program on the disk.

The documentation, which was one of the weaker points of the first two packages, is well-written, for once. It is directed towards the beginner. One of the most helpful sections, that makes up for deficiencies in other packages, is the description of the BASIC interface to the *A2-3D2* package. It explains how objects that are created by the *Object Editor* can be loaded into memory, and animated under control of a BASIC program.

While this graphics editor is a great help and is easy to use, it lacks the important features of a true database editor that would allow the user to unlock the potential of the *A2-2D2* graphics package. Hopefully, a future version of this package will include a true database editor.

A2-3D1 & A2-3D2

subLOGIC Communications Corp.
$119.85
48K; II/II+/IIe/IIc

Overall Rating	B-	A-	*Reliability*
Ease of Use	D+	B+	*Error Handling*
Documentation	C	C+	*Value for Money*

subLOGIC's *A2-3D1* three-dimensional graphics package uses true Machine language algorithms to draw and project objects using a 3-D graphics database onto a two-dimensional television screen. It is the only package that defines all of the objects within the database in relation to each other. Essentially, each of the object's points are defined in precise X,Y,Z locations, while the user's viewpoint is moved around an X,Y,Z coordinate system environment. Objects tend to advance, recede or even rotate as one circles an object while viewing it with a specific pitch, bank, and variable heading. This approach to 3-D graphics lends itself to applications like flight simulators, architectural drawings, and even games.

The program is quite fast (approximately 150 lines/sec.). Obviously, frame rates depend on your driver software and the number of lines drawn on the screen during one frame. *A2-3D1* includes smoothing techniques to allow you to draw on one graphics screen while viewing the other (ping-ponging) and to accomplish array smoothing. The latter does all its calculations and stores its projection data, including the option for clipping lines, before drawing to the screen. It is almost like dumping to the screen as opposed to forming an image a line at a time. Image flickering still occurs, but all the lines are onscreen for the same amount of time. The viewer's frame of reference can be anywhere within (+) or (-) 32,767 limits in any of three axes, with full-circle freedom of pitch, bank and heading viewing. There is also a variable field-of-view command which changes the viewpoint to wide-angle or telephoto.

Databases are generated with a utility called *Develop*. Versions are supplied in both Integer and Applesoft. The program allows you to choose op-codes for either a start point, continue point, ray, etc., and to enter the proper values for the X,Y, and Z positions. This is done for each data point and all objects in the database. The utility isn't very versatile since it lacks the ability to later edit, insert or delete data points. However, it does offer a view function that allows you to see what is created. It is not interactive, although you can move the eye position for better viewing. When finished, the databases can be saved to the disk for later use.

The most difficult and crucial step in working with this program is implementing a Machine language or BASIC driver program. The driver is actually an elementary program that moves the eye around the database, while adjusting its coordinate position, pitch, bank, and headings. You simply poke values into the memory locations for the eye and then call the 3-D package. The view as seen by the moving eye produces the screen animation.

The documentation leaves a lot to be desired. It is very complete but lacks clear explanations of how to implement many of its functions. There are actually two manuals. The short Load and Go manual tells how to use the *Develop* package and offers several BASIC program examples as drivers. The main documentation is a reference manual which details the program's main functions and all its op code structures. It is better suited to Machine language programmers; definitely not for beginners.

This is an extremely powerful graphics package. It offers more flexibility than its competitors' products. It

lacks several useful features; however, these have been added in the *A2-3D2* enchancement.

A2-3D2 is an enhancement of *A2-3D1*. It offers two substantial changes: (1) five color graphics plus twice the resolution in the black-and-white mode and (2) independent object manipulation. It also frees the memory constraint of the 32,767-byte environment from the consequentially inherent overflow which occurs when the graphic's values are rotated and exceed the limit.

The ability to perform independent object manipulation is this package's greatest strength. One isn't limited to sixteen objects as in the competitive packages; therefore, the user may multiple-call or even nest the objects. When objects are nested and then rotated on their axes, other attached objects also rotate in unison. The independent object, which is defined as a block, is called by an op code in the database. This op code contains the location of the independent object's coordinates, plus its pitch, bank, and heading. It also includes a countdown feature, so that if, for example, it were a photon torpedo, it would disappear after so many screen cycles. Thus, an object could be moved around the screen by a BASIC program which poked new locations into that calling op code. This can be done simultaneously while your viewing perspective is moved independently within the 3-D database or world.

To state that the package is powerful is a mild understatement. It is approximately ten times faster than the previous version while operating in the normal B & W mode. The documentation is thorough (but difficult) for beginners.

These two programs are only sold together for the combined price of $119.85.

UTILITIES

Utilities
General

AMPERKIT #1
MicroSPARC
$39.95
64K; II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Amperkit #1 is an add-on subroutine library to MicroSPARC's *Ampersoft*. (See separate review.) You call these subroutines with the ampersand symbol ("&") or amper vector; they act as new commands which expand Applesoft and make it better able to deal with large programs. Taking a quick look at them, we first come to IF...THEN...ELSE and GOTO/GOSUB referenced to labels rather than line numbers. Then there is a nifty chain utility that lets you load program modules as needed and a way of adding new lines to a running program. For the finale, there is a very flexible routine for sorting one- or two-dimensional arrays. All of these add up to new strength and versatility for poor old Applesoft.

The IF...THEN statement is a powerful tool for conditional branching, but as executed in Applesoft, it has a serious shortcoming: if you wish to test a variable for more than two values, you must use two or more lines. Using "& ELSE" permits additional "& IF...THEN commands to follow it within the same line and also makes the program a little easier for you to read (quite handy when it comes to debugging). Speaking of debugging, have you ever tried to remember what was supposed to happen when the line "1090 GOSUB 22400" was executed? In a large program, the ability to write "1090 & GOSUB PRINT ROUTINE" could make for more logical reading and, under some circumstances, make the program run faster.

Speaking of large programs, what do you do if it won't all fit in the machine? With "& CHAIN", you simply call up modules as you need them and place them wherever you want them. This lets you quickly and easily do certain things which normally are either difficult or impossible with ordinary Applesoft. The "& EXP" statement lets you write and enter program lines while the program is running and is especially useful for entering or changing mathematical functions. You simply write in a string variable with the new line and it becomes part of your program.

The last command that I'll mention is "& COS" which permits sorting the elements of a one- or two-dimensional array in a column format. The entire array may be arranged in either ascending or descending order depending on the order of one, or as many as nine, columns. It is also possible to sort only part of the array. All of these operations may be done on either numbers or letters.

Unfortunately, I can only skim the surface in describing the features and options available to you with *Amperkit #1*. It is important to note that this utility can be run only after *Ampersoft* has been booted. However, more memory is readily available than with straight Applesoft because DOS has been moved. The additional memory is about 7K, which is helpful because these utilities really come into their own with large programs. While the programs are protected the disks can be copied—a nice idea, indeed. When you look at the catalog, you won't even find *Amperkit #1* listed, and you may simply delete those programs that you do find (from your backup copies, of course) and save your programs on that disk.

Amperkit #1 even tolerates other amper utilities by using a "& &" format; it is compatible with *PLE* by Synergisitc Software and *GALE* by MicroSPARC. The fifty-page manual covers each item thoroughly and with enough sample programs that all users, except first-time programmers, will be able to get very good results. Though having to purchase *Ampersoft* in order to use this program may make it a little less attractive to some consumers, I found *Amperkit #1* has a number of decidedly attractive features. The chain command really shines with large programs, while label referencing and sorting are things that are helpful to nearly anyone, anywhere. The commands are certainly simple to use, and I've been pleased with the results.

AMPERSOFT

MicroSPARC
$49.95
64K; II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Ampersoft is a collection of machine language subroutines that you are called by using the amper vector or the ampersand sign (&). These "new commands" include changes to the catalog for easier loading, a DOS mover, the Print Using statement, and other programming and mathematical functions. Whether these would interest you depends on your specific programming needs, but there are some statements that almost anyone could use.

If you write programs that require a dollars and cents format for the proper results, then *Ampersoft* may well pay for itself in its very first use. Trying to get columns of numbers to line up or to print something as basic as "Total Sales $123.45" can be an exercise in frustration since Applesoft lacks the Print Using statement which makes these things simple. With "& PRINT USE", you need only make one string (or as many as you need) for your format, include the labels and required special characters, and then position it while a second string supplies the data to be printed. Now numeric and alphabetic formatting is as easy as pie. The statements "& SORT", "& MATRIX", and "& STORE/RECALL" allow numerical and string arrays to be manipulated with speed and ease.

Sorting is always bothersome, but if ascending order is acceptable to you, then you can do one- and two-dimensional arrays of both alphabetic and numeric data. While I did not understand all of the matrix operations (identity, transposition, inverse, multiplication, and minima, maxima and absolute maxima) they all did what they were supposed to (I think) and ran very quickly. I can assure you that Applesoft subroutines this complex could not be written in one commercial break during Monday Night Football!

"& STORE/RECALL" lets you write these arrays to disk in a way that is very compact and many times faster than using ordinary files. There is even an array printing statement that can save you a few minutes of your precious time and provides a neat, though simple, display format. "& FRE" and "& CLEAR" are especially valuable for large programs as they permit you to clear unused arrays to save space and to perform "housecleaning" on unused strings at a claimed speed of 200 to 300 times faster than Applesoft. The catalog enhancement puts a special character in front of each program name so you can RUN, BRUN, LOAD, BLOAD, or EXEC any program with just two keystrokes.

The fact that the disk is copyable means that you can save your work to a disk that has *Ampersoft* on it and then make it a "turnkey" or self-starting program. Moving DOS to the upper 16K frees up more memory than *Ampersoft* uses but means that you must have a machine with 64K or more. The documentation is thorough and includes enough examples to illustrate every function. However, there are a few small errors to watch out for.

In addition to the "new commands," there are utilities to make FID, MUFFIN, COPYA, and RENUMBER (from the Dos Master Disk) compatible with *Ampersoft*. *PLE* (*Program Line Editor* by Synergisitc Software) can also be converted, but *GPLE* (*Global Program Line Editor*, distributed by Beagle Brothers) does not appear to work. MicroSPARC's own global editor, *GALE*, works without changes and *Double-Take* (by Beagle Brothers) can be used by including a line in your program to reset the amper vector (explained in the *Ampersoft* manual) each time you run it. While I don't need all of the features that *Ampersoft* provides, there's enough here that it will take up permanent shelf space in my software library. I like this program a great deal. If any of the aforementioned features sound appealing to you, by all means make a $49.95 investment that you won't regret. (See the review for *Amperkit #1*, an add-on to *Ampersoft*, in the Utilities section of this book; it, too, is definitely worth checking out.)

BUG BYTER

Advanced Ideas
$47.50
48K; II/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A	A-	*Value for Money*

Bug Byter is an excellent debugging tool. It is totally relocatable, or it can be run in a RAM card, making it virtually transparent to the program being debugged. A user-definable display is one of its outstanding features. All 6502 registers and flags, a definable portion of the stack, mnemonic disassembly, selectable memory locations, breakpoints, and the command line are displayed simultaneously. This feature enhances the *Bug Byter*'s effectiveness and makes it an excellent program for anyone learning assembly language programming.

One of the outstanding features is the variable speed tracing of software while watching the Hi-Res Graphics screen, a real benefit in debugging graphics routines. Cycle counting is also provided, a great help for

writing timing-dependent code, or determining the fastest way to code a particular routine.

Bug Byter does have several limitations: its excellent screen display makes hard copy output impossible; further, it lacks conditional breakpoints. Nevertheless, it provides very good value for the money.

DOUBLE-TAKE

Beagle Brothers Micro Software
$34.95
48K; IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	B	*Value for Money*

Double-Take is a collection of twenty-three Machine language routines that make your Apple more flexible and easier to use. All are loaded into the memory and "hidden" when you boot the *Double-Take* disk or BRUN the appropriate *Double-Take* program. The disk comes with a convenient keychart overlay for the keyboard; this reduces the need for memorizing the commands. *Double-Take* is also compatible with *Pronto-DOS* and *GPLE*, on or off the language card or bank-switched IIe. *Double-Take* uses the ampersand (&) vector extensively and is not compatible with other Amper utilities.

The following list gives you an overview of the utilities included in the program, some or all of which may be loaded above HIMEM:

(1) New List lists each program statement on a new line.
(2) Two-Way List Scrolling allows you to search through listings in both directions.
(3) Printer listings can be requested with a range of line numbers and a specified width.
(4) Catalog with Free Sectors Remaining displays the number of empty sectors, puts blank lines in deleted file space, and allows two-way scrolling.
(5) Hex/ASCII Dump displays on screen or printer the contents of a range of memory with two-way scrolling.
(6) Monitor Disassemble lists Assembly language instructions from the contents of memory featuring two-way scrolling.
(7) Hex/Decimal Convert prints the hex equivalent of any decimal number and vice versa.
(8) Monitor BASIC allows the entry of monitor commands from BASIC.
(9) Append can load two Applesoft programs in memory, either hidden from each other or merged together.
(10) Renumber initiates the re-numbering of all or part of any program in memory.
(11) Auto-Number prompts you with the next line number while you are entering a BASIC program.
(12) Vital Statistics displays the decimal and hex addresses of various allocations of memory in running an Applesoft program: program, variables, arrays, free memory, strings, etc.
(13) Variable Cross Reference and Display shows all variables sorted alphabetically, followed by the line numbers in which they appear along with their values.

If you write Applesoft programs, *Double-Take* is an outstanding aid. All of the commands are useful, and all are executed in an efficient, logical way. The program's presentation is attractive and easy to read. Its compatibility with *Pronto-DOS* and *GPLE* greatly adds to your machine's capabilities. The Beagle Brothers are preeminent in the field of Apple utilities, and this is certainly their crowning glory.

MATHEMAGIC

Brightbill-Roberts
$89.95
48K; II/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B+	*Value for Money*

MatheMagic is just what everybody claims to want—a way to turn the Apple into a super calculator. The program allows you to create free form expressions (equations) up to 240 characters in length using standard math symbols and conventions. It allows you to pre-define variables, or have the system ask for a value each time the expression is calculated. The program contains pre-defined functions for trig and log conversions. It also supports base conversions (i.e. hex to decimal, decimal to hex).

When calculating an expression, you can request that each calculation that the system performs in solving the problem be shown; or you can let it run quickly to completion. You can change variables, or change the expression itself, which allows you to do a certain amount of "what if" evaluation.

You can store equations and/or variables to disk for later use. The program has the ability to pass or receive information from outside programs or data.

The display is well laid out on the screen, providing you with a menu for the operations currently being performed and a display of the current expression, as

well as a "workspace" where the actual calculations are performed.

The program is easy to use because it includes several help displays which you can activate at any time during the program's operation. The documentation is reasonably complete, and includes a set of sample application and technique guides useful in learning the program.

All in all, I feel that *MatheMagic* has potential in two areas: first, for those who wish to have a sophisticated calculator-like program; but, more importantly, for students who wish to have the step-by-step evaluation method available, enabling him to see how a problem is solved—extremely valuable in the learning process. An additional feature supported in this mode (step-by-step) is the printing of these steps on the printer for later review.

In summary, as educational programs go, this is an excellent package. It seems to be well written, reliable, and does what it claims to do.

MENU!

Computing!
$149.00
64K; II/II+/IIe/IIc; Z80 Card

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B	B+	*Value for Money*

The CP/M operating system, although a boon to Apple users because it makes a wide range of programs available and is the closest thing yet to a transportable system, is not very "friendly" and can confuse the beginner. The people at Computing! have come up with a utility program called *Menu!* that adds some friendliness to CP/M while extending its capabilities. You load in this 16K program after booting up CP/M. It takes over, adding some new commands and making old ones easier to use. The familiar A> prompt becomes AO: which tells you that you are logged onto disk drive A and in user area O. Entering "?" displays all the available commands. DIR still gives you a directory listing, but *Menu!* makes other commands simpler, if slower, to use. Typing RUN brings up a listing of all the .COM files on the disk with a number in front of each. Enter the number of the program you wish to run. *Menu!* asks for confirmation; when you enter Y the program runs. This eliminates typing mistakes. Most other commands work the same way: enter the command, get a numbered list of files, and enter the number of the file with which you want to work. Commands new to *Menu!* include "Space," which provides information on space taken and free on a disk; "Size," which gives file statistics; "Test," which checks the disk for bad sectors; "Protect/Unprotect," which guards against accidental deletion of a file; and "CP/M," which returns you to CP/M.

The "Restore" feature of *Menu!* may justify the cost of the program after one use, since it may stop you from putting your foot through the monitor after accidentally erasing a file. As long as you haven't written anything to the disk meanwhile, Restore will automatically bring back the deleted file. Another benefit is the new error messages that replace the cryptic ones of CP/M. For example, you get Disk full on A: instead of BDOS ERR on B:. In addition, you no longer have to hit CTRL-C each time you change disks; *Menu!* takes care of this for you automatically.

The manual contains a table of contents, functions index, and error message section. It discusses each command in depth with plenty of examples and little jargon. Moreover, Computing! offers telephone support for *Menu!* for three hours on Tuesdays and Thursdays, with a $15.00 charge for each call payable by Visa or Mastercard only. I doubt you'll need this service, however.

An additional program, "Password," allows you to enter user areas 16-31, normally hidden from use in CP/M. Combined with the features of *Menu!*, the total program competently corrects some of the shortcomings of CP/M. It makes using a computer easier—and aren't computers themselves designed to make things easier?

MOCKINGBOARD

(Hardware)
Sweet Micro Systems
$99.00
48K; II+/IIe

Sound has always been the most glaring weakness of Apple computers. While other machines easily produce three- and four-voice musical compositions and sound effects to rival coin-op arcade games, Apple computers force their owners to settle for half-hearted tones from a tiny (one inch) speaker. You see, Apple II's designers didn't include a sound chip. Instead, they allow the programmer to click the speaker. Fast enough clicking produces a tone. Unfortunately, this means that in games the computer spends most of its time producing sound effects and music rather than drawing graphics. Other computers need only pass sound parameters to their sound chips and voila! sound until you shut them off.

The *Mockingboard* comes to the rescue with a six-voice stereophonic sound board that normally plugs into slot 4 in the Apple. While its two half-watt amplifiers can power small speakers, the manufacturer recommends plugging the board into your stereo system via the auxiliary inputs. Take their advice—the board produces sound equal to the range of the best stereo systems.

The *Mockingboard* consists of a circuit board with two General Instruments sound chips. Each of these has three voices or channels capable of generating eight different sound wave shapes with varying attack, sustain, and decay rates. Wave shapes include saw tooth with a slow attack rate and instantaneous decay (helicopter sound), for example, or slow attack rate with slow decay (chugging train sound). Others either have a slow attack and fast decay with no sound afterward (a ping), or start out loud and decay slowly (a gunshot), or the reverse with their loudness, attack, and decay patterns. You can add varying amounts of noise to the sound effect and set each of the three channels for pure tone or pure noise, thus achieving effects with varying combinations of tone and noise. When I talk about noise here, I'm not talking about garbled sound, but the randomness in the tone required to produce sound effects like gently breaking waves or automobile motors.

Prospective buyers may well ask, "Is the board with all its capability worth the price?" The nonprogrammer will need software to run it and there just aren't many entertainment products available that use it. With the exception of the *Music Construction Set* and a few others, the dozen or so programs that do use the *Mockingboard* employ it for a musical introduction or a few enhanced sound effects. *Lancaster*, a Silicon Valley Systems game created by Will Harvey, the teenaged programmer who created *Music Construction Set*, has both background music and nice sound effects throughout. *Zaxxon* by Datasoft also makes good use of sound effects, but some of the Penguin games and *Broadsides*, an SSI game, implement their sound effects poorly. Other games, like *Ultima III*, *Black Belt*, and *Microbe*, purportedly use the *Mockingboard* for sound effects. However, the real incentive for owning a *Mockingboard* is to produce stereo quality electronic synthesized music via the *Music Construction Set* (reviewed under "Home/Personal"). Where the Apple speaker version barely plays one note each from the bass and treble clefs, *Mockingboard* plays a three note chord for each of the clefs, treble clef on the left speaker and bass clef on the right. In addition, the sheet music display scrolls during play if you have installed the *Mockingboard* but remains stationary if sound is ported to the tiny Apple speaker. The difference between the two sound systems is like night and day. The "Dance of the Sugar Plum Fairy" on *Mockingboard*'s demonstration disk shows the board at its best.

Curious owners might want to try creating their own sound effects even if they lack programming skill. Since developing sound effects remains a largely experimental endeavor, Sweet Micro Systems includes an easily used sound utility on their demonstration disk that allows you to adjust the sound quality (tone and noise periods), volume (amplitude), and patterns (envelope period and shape) of the desired sound effects, then save it to disk. You can change any parameter by moving the cursor around the screen and set one or more channels for each speaker. For example, if working with a pure tone, you can develop a musical chord by putting a middle C note in channel A, an E note in channel B, and a G note in channel C.

Once you have created sound effects, you can easily incorporate them into games or other programs in either Machine language or BASIC. The technique is rather simple. You pass sixteen sequential parameters to the sound chip via a supplied subroutine called TABLE. You need only place these sixteen parameters into memory with a FOR...NEXT loop. A CALL to INIT initializes the board, then another CALL passes the parameters to the board where they become sound. Finally, you stop the note or sound effect by a CALL to RESET, which places zeros into the sound registers. An alternate set of subroutines and storage locations exists for the second sound chip. You can easily program one sound effect on one speaker and another, or even a musical background, on the other speaker.

The *Mockingboard* comes with a comprehensive manual, thoughtfully written for unsophisticated users. It explains difficult concepts with analogies to everyday sounds like steam escaping a tea kettle. It teaches by encouraging you to experiment with the sound utility. Several BASIC language examples show you how to incorporate sound effects derived with the utility into your own games. Although it's very cookbookish, advanced programmers will appreciate the inclusion in the appendix of Machine language drivers that BASIC users make a CALL to. The manual also includes extensive detail on the optional speech synthesizer upgrade via two empty sockets (a product that I didn't review for this article).

The *Mockingboard* has had to contend with the "chicken and the egg" software dilemma. Programmers thought it a passing gimmick, with too few sold to make programming for it worthwhile. The manufacturer offered to do many of the early conversions, but without a substantial number of products making use of the board, consumers had no reason to purchase it. My attitude (shared by many programmers) changed with the publication of the *Music Construction Set*. Finally, I have a good reason to buy the board. With an

increase in the number of boards sold, I expect more software to make use of it.

The *Mockingboard* is a definite plus for the Apple. It greatly enhances the computer's sound capabilities, while an optional upgrade to the board adds speech capabilities. This replaces other boards that require an additional slot. The real decision depends on whether you want to spend the money to enhance the sound capabilities of the dozen or so software products that support it. If you enjoy computer synthesized music or are a skilled programmer who wants to experiment, buy it. But if you just want sound effects like those on the Atari or Commodore computers, wait.

There are four versions of *Mockingboard*. Version A is stereo music and sound effects, and goes for $99.00. Version B is plug-in speech, which costs $89.00. Version C combines the first two at a cost of $179.00. Also, there is a *Mockingboard* for the Apple IIc: Version D, which is $195.00.

mSPEED II

Applied Analytics Inc.
$395.00
48K; II/II+/IIe/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	A	C+	*Error Handling*
Documentation	A-	A	*Value for Money*

mSPEED II system contains essentially three packages. First and foremost, *mSPEED II* supplies an arithmetic processor to handle all integer and floating-point calculations. Secondly, it provides Applesoft and Pascal booster diskettes for booting up Applesoft or Pascal to utilize the arithmetic processor. Finally, *mSPEED II* offers a FORTH language system coupled with the arithmetic processor board. All of the above features are excellent, and any one justifies the cost invested in the system.

The documentation is readable, color-coded, complete, and fully indexed. There are some minor holes in the documentation, but nothing that a few hours of actual use can't solve. Examples are clear and well explained; they show the novice how to apply the concepts of FORTH to problem solving. But I found a knowledge of Hewlett-Packard calculator programs helpful, as well as some previous exposure to FORTH programming.

The advantage of this FORTH over many others is its ability to quickly handle single and double precision integer calculations, both high and low resolution graphics, and floating-point calculations involving, for instance, sines, cosines, squaring, and other exponentiation. Once you understand the theory of stack operations, and as long as you remember that the floating point stack can only contain four values, programming is simple and straightforward.

As if this weren't enough, the text editor is superb. Two editors come with the program. The line editor lists or deletes a specific line using the Apple edit commands, inserts lines, finds a specific string in the text, and changes a string. The screen editor displays a full page of text and allows you to edit anywhere on the screen with the use of twelve Control codes. Both have their individual advantages and are helpful for inputting and editing a file.

The graphics verbs (call statements) are self-explanatory. *mSPEED II* conveniently uses the same verbs as Applesoft. Moreover, Turtle graphics verbs are also available.

The two booster diskettes come without instructions, but they are easy to use. Instead of booting with the standard system master diskettes, you should utilize the appropriate Booster diskettes. However, to use either of the Booster diskettes, a language card must be available for the storage of Applesoft and Pascal. Once you have installed this card, the system appears exactly as any other Apple II system. The BASIC statements are the same, and access to and from the disk is the same. In fact, programs predating your installation of *mSPEED II* will still load and run. The increase in speed due to the arithmetic processor is amazing and must be seen to be believed.

Applied Analytics has brought the Apple II into the world of Real-time control, scientific number crunching, and simulation. This accomplishment, along with the superb documentation, copyable disks, and ease of use, makes this package a must for anyone who is tired of waiting forever for their BASIC programs (even when compiled) to run and yield answers.

RELOCATING LINKING LOADER AND LANGUAGE PLUS+ (2 volumes)

Micro Lab Inc.
$50.00 per volume
32K; II/II+

Overall Rating	C	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	B	C	*Value for Money*

The Relocating Linking Loader and the *Language Plus+* utility programs are purchased as a twin-pack

and come as two individual disks. Procedures for their use are amply detailed for the experienced programmer in a two-part operator's manual. The *RLL* program allows you to establish and maintain a versatile library of handy utility routines. These can be loaded into different memory locations and linked into a larger program or programs.

The *RLL* program was originally designed for use with the *Language Plus+* programs, enabling you to select desired modules from an already established library of Ampersand routines and to combine them into a single binary file on the disk suitable for use with your own Applesoft programs.

The *RLL* has two separate functions: a relocation function and a linking function. The relocation process involves the construction of a memory map based on the numbers and sizes of the modules you plan to include in the output file. Once loaded, the files are automatically scanned. Each module is examined to identify any addresses and/or internal pointers that must be changed. The addresses and pointers are then recalculated and rewritten into the file. The *RLL* program was designed to be used in conjunction with relocation files generated by the Apple DOS *Toolkit Editor/Assembler*. Turning to the linking process, it involves only those modules that include references to other modules. For example, the modules used to construct one large program might need to share some variables contained in yet another module. You can use the linker to resolve all of the addressing problems involved in this kind of operation.

The handiest feature of this program is the summary, which provides a CRT screen or line printer output representation of the memory map filled in with all of the file names, addresses, and labels used by each module. This data can prove to be an indispensable aid in debugging newly created modules. The *Language Plus+* disk consists of twenty utility program routines which are invoked by the use of the Applesoft Ampersand (&) command, hence their name "Amper" routines. Operational Notes describe how each of the routines function when you invoke them. Programming Notes provide hints on how to best use the routine in question.

Amper CATALOG
Amper COMPACT
Amper DATE CONVERT
Amper DEALLOCATE
Amper FIX
Amper FREE MEMORY
Amper GARBAGE COLLECT
Amper HELLO
Amper INPUT ANYTHING
Amper INPUT/OUTPUT
CLOSE
CREATE
OPEN
READ
WRITE
Amper INSTRING
Amper INVERT
Amper KEYIN
Amper MATCH
Amper QUICKSORT
Amper STRING LEGAL
Amper SUBSTRING
Amper SWAP
Amper TRIM
Amper WORD

Although clearly not for the novice, these two programs are handy tools for the seasoned programmer to have available in his software library. The documentation included in the twin-pack is adequate and clearly stated. Numerous examples are provided to assist you through those areas which could prove to be too confusing or difficult.

MUNCH-A-BUG

Roger Wagner Publishing, Inc
$39.95
48K; II/II+/IIe/IIc/III in emulation

Overall Rating	B	B+	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B+	B+	*Value for Money*

Munch-a-Bug is a 6,502 debugger modeled after *DDT*, the widely used CP/M debugger. It relocates itself below DOS, or may be run in a RAM card. Only four user-defined zero page locations are required, eliminating conflicts with user software.

Munch-a-Bug's unique "pass pointers" feature provides a powerful addition to its standard features. A "pass pointer" allows the execution of a machine language subroutine without affecting the main program, enabling complex conditional breakpoints to be created. The ability to define and connect a symbol table (labels) is another helpful feature.

A number of memory modification commands, a variety of screen displays, and many well-designed functions make *Munch-a-Bug* a fine debugging tool. Its convention of command followed by address (the opposite of the Apple monitor) is a minor point. *Munch-a-Bug* performs its debugging functions well.

SILICON SALAD

Beagle Brothers Micro Software
$24.95
48K; II

Overall Rating	B+	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C+	A	*Value for Money*

What can I say? This disk contains well over a hundred programs, including utilities, games, and programs that are just plain fun. One program even adjusts your disk so that it can store 210 files instead of the normal 105. Of course, without it this collection wouldn't be possible. Like the other Beagle Brothers software, it's unlocked and unprotected. With the disk comes a handy peeks and pokes chart and an Apple Commands chart to post on your wall.

The disk divides into four basic sections. The first, the Main Menu, consists mostly of short programs, games and tricks that will delight the heart of the programmer. It has everything from an Error Trapper that lists the offending line and points at the problem statement, to Snake Cars, a dice-rolling game. A few "worthless" programs do strange and unusual things that have absolutely no use but are interesting anyway. However, the majority of the programs are utilities. Everywhere you look, you'll find more. Disk Scanner searches out damaged sectors on a disk and marks them as bad sectors on the volume track sector list or volume table of contents (VTOC). Text Screen Formatter allows you to format text onscreen. The program then changes all statements to the proper vertical tab (VTAB) and horizontal tab (HTAB) positions and puts out a simple Applesoft listing. You can then add this to your own program, which sure saves the hassle of doing it by trial and error. The utility section doesn't stop here, either. Plenty of helpful and educational programs will keep you busy for many a blissful hour.

Two lines of text can pack in enough information to do dramatic things. Most of the two liners here focus on graphics, such as repeated random patterns, three-dimensional graphics, funny text movements, and others. Don't worry, though, it'll only take a couple of hours to enjoy this section (although it'll take many more hours to see how it's all done).

The last section is relatively short and basically fun stuff. A couple of interesting programs serve as eye-catching utilities, while others serve no purpose at all. These programs were made for fun and nothing else.

Normally, if someone asked me what I liked best about this disk of programs, I'd have trouble answering. As it is, no problem. Where else can you learn by example for so inexpensive a price? Not all of the programs are useful to everyone, but then they aren't meant to be. It's an experience, and an enjoyable one at that.

SOFTSIGHT

Overdrive Computer Corp.
$40.00
32K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B+	B	*Value for Money*

Softsight is a Machine language debugging program for the Apple which allows you to monitor and even change another Machine language program while it is running. While this is a valuable tool for the seasoned programmer, it can also be useful to the beginning Machine language programmer as it shows exactly what is going on inside your Apple.

To use *Softsight* you merely BLOAD your program and run it. *Softsight* understands twenty-eight commands, each comprised of a single character and an operand. For example, enter S at the command prompt and a single instruction will be executed. Among some of the commands offered are memory dump, list, alter, find, move, set break points, display stack history, and trace. *Softsight* is like a window into the 6502 chip through which you can see, control, and even alter what is happening.

You may suppress the tracing of loops and subroutines, use just part of the screen for output, switch from graphics to text pages or send output to an 80-column card or printer. A mini-assembler is also included.

Softsight is almost totally transparent to the user, and warnings about possible conflicts are mentioned in the manual. If you have a Language card, you can load *Softsight* into it. The manual is quite complete and has a table of contents as well as a summary of the *Softsight* commands and error messages. *Softsight* operates on a normal DOS 3.3 diskette. This means that you may make as many back-up copies as you need. Also included on the disk is a self-running demo.

If you are looking for a program to help you debug Machine language programs, or are just beginning to learn Machine language, then *Softsight* is worth investigating. It performs as advertised, and is competitively priced with comparable products.

THE VOICE

Muse Software
$39.95
48K; Apple II/II+/IIe/IIc/III

Overall Rating	B+	A	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	A	A-	*Value for Money*

The Voice is a speech package which allows you to create voice sound, and to save on disk created words and phrases, or combinations of a pre-recorded vocabulary. *The Voice* can easily be added to programs.

There are three simple cafeteria-type menus: the Main Menu, the voice editor program, and the word edit screen. The Main Menu has three choices. Two are repeating Machine language demos which use *The Voice* and display Lo-Res color graphics. The third choice is the voice program, and it has seven options from which to make further choices and additions.

Two methods of recording a word are documented, and both require a standard cassette recorder. Direct recording puts the word you speak on tape as well as in memory. The second method transfers words already on tape into memory. In both cases, immediately upon stopping the recording, the word edit screen is displayed.

Within the word editing program you may play back, increase or decrease the playback rate (and thus change the pitch), and edit by adding or deleting spaces or sounds at the beginning or ending of the word. Changing the volume and/or tone of the cassette recorder while recording can also improve the sound.

Once editing has been completed to your satisfaction, the word can be saved on disk. After saving a set of words, phrases from within the set may be played back from disk. If a particular word does not sound right within the phrase, it can be recorded again and the old word over-written, and/or tone changes and pauses may be added within the phrase to improve the quality. It is also possible to add words to the end of the original phrase.

Another editing feature is the ability to create multi-word files. The advantage to saving a series of words under a single name is that it allows the group to be loaded from disk into memory with a one-word command. By selecting either "load" or "save," the catalog of the existing vocabulary is displayed and all or part of it may be transferred to or from disk or memory. Once saved, it is possible to delete individual words from the vocabulary disk, and to sort the words alphabetically.

The program disk has only a limited amount of space for word storage, but the method of initializing a new disk (13 sector format) is provided. *The Voice* subroutines are transferred during initialization. The Apple Muffin program transfers the words and sub-routines to an initialized 16 sector disk, which can in turn be used to store an Applesoft BASIC program using *The Voice* words.

The program provides a well-documented section including an Integer and Applesoft BASIC sample program. CALL entry points and a Voice memory map are clearly charted. The documentation concludes with a good trouble-shooting guide.

I am not impressed by the commercial demos in this package. They are colorful, but not particularly appealing. A Hi-Res graphics animation accompaniment, with a little more effort to eliminate the stilted voice pattern, would help. Other than the demos, the package is a fairly good, inexpensive, easy to use, software-driven voice emulator.

XPS-DIAGNOSTIC

XPS, Inc.
$49.95
48K; II/II+/IIe

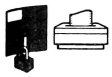
Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

This Apple hardware diagnostic program for users and technicians alike checks all of the major systems of your computer and tells you whether your system is working properly or not. It can help the vast majority of us who aren't experienced in electronics eliminate unnecessary trips to the repair shop and save time when there.

Interestingly enough, you need no hardware expertise to operate this program. All you have to do is boot up the *XPS-Diagnostic* disk and select the tests you want to run: main memory, game control, drive speed, media, color bar, keyboard, CPU, printer, firmware card, focus, system ROM, disk system, peripheral card, and language (16K) card. In addition to its user-friendliness, the program has two outstanding features—its linked mode capability and its printed report option. The linked mode feature allows the program to run your choice of the tests for a fixed number of passes, then the program starts the next test until it has completed all that you selected. The printed report option gives you a printout of the results of each of the tests, again enabling you to use the program unattended.

I encountered only minor problems. I had to reset the program if I selected anything other than slot 6 drive 1 for disk testing. Also, the program had trouble identifying my Videx Videoterm board in its peripheral card test mode. However, when you weigh these minor problems against the excellent documentation, simple

menu-driven operation, and ease of use, it's obvious that the folks at XPS have a winner in this Apple utility.



Applesoft Programs

APPLE MECHANIC

Beagle Brothers Micro Software
$29.50
48K; Apple II/II+/IIe/Iic

Overall Rating	A	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A-	A	*Value for Money*

Apple Mechanic provides you with a powerful utility, some smaller programs, and an entertaining lesson on the abilities of Applesoft. The utility, a comprehensive shape table editor, makes Hi-Res graphics a snap. A few subroutines help you make music, clear the screen in unusual ways, and move between Hi-Res pages. *Apple Tip Book #5* includes such gems as a Print Using statement (sort of), a neat little program to point out where you went wrong when you get a SYNTAX ERROR message, and a program to convert Arabic to Roman numerals. Uncle Louie's Two-Liners, a collection of two line programs, ranges from entertaining to mind-boggling. Last, but not least, the Peeks, Pokes, and Pointers chart contains all manner of information useful in programming. On top of all this, the disk is copyable.

The Hi-Res part of *Apple Mechanic* involves shape tables. It includes two programs on creating shape tables, two programs on using shape tables, two utility programs, and some demonstrations. (Shape tables are simply a set of instructions to draw an image on the screen.) Using shape tables, you can plot (or turn on) any of 53,760 points on your monitor (which reproduces Hi-Res images much better than a television set). While easy to use, these instruction sets are an absolute pain to prepare. "Shape Editor" and "Font Editor" allow you to create the image and let the computer write the shape tables to recreate it. Shape Editor handles free form images or pictures; Font Editor creates character sets. (A font consists of all the uppercase, lowercase, numeric, punctuation, and special characters in one style.) In either case you move the cursor to draw the image on the screen. When satisfied with the result, you can Save it as a shape table for later use in a program. You see what you are doing in enlarged form (3X magnification for Shape Editor and 10X for Font Editor) and actual size simultaneously. You can choose to draw a shape from scratch or edit an existing shape if created with this program. The actual drawing process takes a little practice at first.

Xtyper and Hi-Writer allow you to use the fonts that you have created or the ones included on the disk to either add characters to an existing image or to provide a subroutine for inclusion in a program to use these characters instead of the Apple standards. If you decide that you don't need all the characters in a font, use "Font Splitter" to eliminate those that you don't want and at the same time save some space in memory. For additional fonts see *Typefaces*, another Beagle Brothers disk.

"Shape Analyzer" lets you look at a shape in different colors, sizes, rotations, and locations, as well as showing you the actual shape table for any image. The only problem with Shape Editor is that it limits you to twelve shapes at a time. Also, the size of each shape (48 by 63 points) is not even a fraction of the screen—a bother only if you wish to create one massive image to fill the entire screen. Normally, you create shapes and then move them around (as in a game) or put them in one place. The shape size suits these applications.

I cannot cover everything available on this disk, but it should be obvious by now that I like this program. It is not perfect, however. For example, the manual leaves several things to discover on your own. Also, although the programs worked well, they still crashed several times when I did something odd. This reinforces my warning to save your work often and never work with your originals until sure of what you have done. Nonetheless, the programs work reliably and a person with little knowledge of computer jargon can read (and enjoy) the manual. Most telling, I always keep *Apple Mechanic* close at hand when I am programming.

APPLE SPICE

Adventure International
$29.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A	A	*Value for Money*

Apple Spice is a tool to enhance the capabilities of Applesoft, making it compatible with more advanced BASICs. Essentially, what is missing in Applesoft is the Print Using function, the If...Then...Else statement, and a faster method for scanning string inputs for a particular string of characters. *Apple Spice* remedies these deficiencies by linking these routines via the & and USR functions in Applesoft.

Print Using is a handy feature in most BASICs that allows numeric output to be precisely formatted. For instance, this would allow columns of figures in dollars and cents to be precisely aligned at the decimal point regardless of the size of the dollar amount whether it was a positive or negative sum. This is easily accomplished by substituting the usual print statement with one using the ampersand as in the following example: &Print"###.##", Amount. Amount in this case is just the dollar amount. There is also a useful option that allows you to string together a group of numbers separated by exclamation points in one program line, and using the Print Using function to align them vertically according to your specifications..

The If...Then...Else function works as in other BASICs, except that when the condition fails the Else allows more than one program statement to be executed rather than the usual single statement. Normally when the condition fails in Applesoftt, program flow jumps to the next line. This statement will allow you to execute several more statements in the same program line that follows after the If portion of the line. Nested If...Then...Else statements are allowed in this version.

There is a string search routine that is much faster than using a MID$ in a Do loop. It returns the string and its position in the input line. This routine is useful in interactive programs where it is looking for one or more input strings on which to base its answer, such as in pseudo-psychiatric programs.

The package also contains a screen output module that allows string output to wrap on each word rather than be arbitrarily split on the right side of the screen. It can also do this on an input string. In addition, it will erase characters upon backspacing. This is handy for user friendly programs.

These routines can be incorporated into any BASIC program. These modules can be separated and relocated in memory. Normally, these routines are placed just below the 32K boundary so as not to interfere with utilities such as the Program Line Editor. However, these can be relocated by specifying Himem: before using the relocator.

This is a very detailed tutorial with many examples in its 48 pages. The documentation is quite good. The instructions are easy to follow and make implementation simple. Overall, the package is useful and a powerful expansion of Applesoft.

AXE (ADVANCED EXTENDED EDITOR)

Versa Computing
$69.95
48K: II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B-	B	*Value for Money*

Advanced Extended Editor (AXE) is a program line editor for Applesoft programmers. It greatly enhances the limited line editing capabilities of the normal BASIC editor. Besides having an extended editor with numerous features, it offers search and replace commands for both tokens and ASCII strings, auto line numbering, and complete listing control in a variety of formats.

Of course, *AXE*'s most important feature is its editor. A line is edited by typing E#line number from the Applesoft prompt mode. You should understand first that listing control can either be by individual statements, one each per line within a line number, or in the normal packed mode. The same applies to the editing mode. Statements can be copied, or deleted by row with simple control commands if you are not in the packed mode. However, in the packed or normal mode, you can't simply press the Return key when you are done editing, or you will delete everything beyond the current cursor position. The Control-W combination copies the rest of the line. The usual insert and delete modes apply not only in the edit modes, but when entering the initial Applesoft line. There are other commands for finding a character within a line, and for re-editing the last line you worked on. No, this does not restore a badly edited line in which you made mistakes. In that case, it is best to abort before you enter the line.

AXE has a number of features that can be directly accessed from the Applesoft command prompt. Lines can be entered in an auto number mode. The status of available memory in the Applesoft program can also be checked, or you can check this from the Applesoft monitor.

The utility as a macro feature simplifies the entering of repetitious code. Each macro contains up to sixty-four characters, and can be entered and edited with a macro editor. Many programmers save considerable typing time by inserting common keywords like Print or Input in the table. These can then be entered with a Control-K and the appropriate key containing the macro.

AXE resides just below DOS; it requires 3,300 bytes of memory. It will not support an 80-column card, but offers editing features comparable to the *Global Program Line Editor* from Synergistics. It has some features not found in its rival product, but isn't as easy to use. Overall, this is a good product, very useful to anyone doing an extensive amount of Applesoft programming.

BASIC*

Softesmythe Software
$62.00
64K; II/IIe/IIc; II w/16K language card

Overall Rating	B-	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	C	*Value for Money*

This program enhances Applesoft BASIC, primarily in graphics in complex arithmetic. When you boot the program, the computer loads the interpreter into the language card and the program uses this instead of the normal Applesoft interpreter. You can still run Applesoft programs if you do not use the restricted commands, but you cannot run Integer programs. Applesoft will not run *BASIC** programs.

The manual defines the commands fairly completely, but lacks concrete examples. If you are familar with graphics programming, however, you shouldn't have any problems. If you don't understand some of the complex math functions available in the program, the documentation won't teach them to you. You probably don't need them, anyway, if you don't know what they do. Several sample programs on the disk demonstrate functions; you can list them to determine how to implement the functions. You'll probably find these more useful than the examples given in the documentation.

The graphics features of *BASIC** make it a very powerful graphics programming language. However, to run the graphics program you have created, you must have *BASIC**, which is copy-protected, to load the interpreter. This means that you can only use these graphics features in your own programs, written for yourself (because the program is also copyrighted). If your disk goes bad, you can still run your programs using the backup disk provided in the package while waiting for a replacement.

I really don't see much practical use for this program unless you write programs strictly for your own use. If you happen to write a super program that you want to see, you can't do it unless the purchaser also buys *BASIC**. Perhaps you could work out some sort of license and royalty agreement with the author. Personally, I'd rather do a little extra work myself using a standard language that everyone can run.

BEAGLE BASIC

Beagle Brothers Micro Software
$34.95
64K; II/II+/IIe

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

This set of programs enhances Applesoft and adds new commands and features to your programs. It also lets you rename standard commands and error messages. *Beagle BASIC* gets around Applesoft's permanency by moving it from ROM into RAM—changeable memory. You can use it on the Apple II, II+, or IIe with Applesoft in RAM or ROM.

Beagle BASIC includes a number of enhancements. Command Editor lets you rename any command to almost any (short) word you choose. Error Message Editor lets you reword for clarity or just for fun. List Formatter inverts REM statements, changes the CRT screen list width to 40 while still allowing Escape editing, and alters list indentation from the standard five spaces to anything from zero to thirty-nine. Add New BASIC Commands has several elements: ELSE allows statements of the nature IF...THEN...ELSE; SWAP eliminates the third variable necessary to swap the values of two variables; TONE lets you enter pitch (0-255) and length (0-65,535) to generate music; HSCRN returns the color of any Hi-Res coordinate; SCRDLN scrolls the text screen down one line; TXT2 calls up page 2 of the text; G2 allows access to page 2 of the Lo-Res graphics; CLRKEY clears the keyboard buffer.

Additional changes to Applesoft yield simple new commands for clearing parts of the screen, scrolling up, and ringing the Control-G bell. Simple commands display the various Hi-Res screens and move the cursor around the screen under program control. Three adjustments to the monitor change the Escape editing cursor

to a flashing plus sign, modify the tone (pitch and duration) of the bell, and permit modified GOTO/GOSUB syntax. All changes to BASIC and the monitor cost nothing in memory because the program overwrites the rarely used cassette commands to obtain the new capabilities. My favorite modifications are the flashing plus sign, the inverse REM statements on listing programs, and the cute new tones. The SWAP command and the simplified commands for Hi-Res graphics make programming much easier. I'm sure you'll find some favorites, too.

The program performs flawlessly and delivers as promised. Execution is quick and painless, aided by a super manual (routine with Beagle Brothers software) and a keyboard overlay to help you remember key commands. After you have modified BASIC, you save it to disk for later use. You can save several versions of the NewBASIC to suit different applications. *Beagle BASIC* offers both the casual user and the serious programmer several extensions of Applesoft and a few modifications to the monitor at a reasonable price. Although other Applesoft enhancers offer more, they cost more.

GLOBAL APPLESOFT LINE EDITOR

Micro-Sparc, Inc.
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A-	B+	*Value for Money*

GALE, or *Global Applesoft Line Editor*, is a sophisticated utility to aid the development of Applesoft programs. Primarily, it is a global line editor that greatly speeds up the design and debugging of a new program. But it also features auto line numbering, renumber, search and change, append one file to another, a variable cross reference table, hexadecimal/decimal conversion, and a user-definable set of macro functions.

GALE greatly enhances the rather limited capabilities of the BASIC line editor. The edit mode is invoked by a line number command. This differs somewhat from all of its competitors who use a Control E line number, but this should be of no concern to owners of their first editor. The editing screen appears as a separate screen with the line to be edited in its own text window. This produces a very clean display, with such information as the number of characters in the line, and the current edit mode shown above and below the actual line. The internal edit commands are standard, featuring insert, delete, find character, move to the beginning or end of line, and delete beyond the left and right Arrow-controlled cursor. The restore feature puts the line back the way it was before editing. One of the features this editor has that others lack is the ability to immediately edit an input line before hitting Return to enter it in memory; just type Control G. While the edit window is clean and informative, it erases other listable information (like the surrounding lines on the main screen). This is partially remedied by a toggle screen between the two screens, but in my opinion it is better to be able to see all the information on a single screen.

The global portion of the editor allows string searches and substitutions over the entire program listing. You can make substitutions over a range of lines or on a single line. The renumber command is also very flexible in that you can renumber segments in a program. This is useful in opening gaps for line insertion.

There is an escape table macro feature that is useful for entering the repetitious code. *GALE* has some other useful functions. It can give you the free space on a disk or the load addresses of the last BLOADed file. It can allow you to append one Applesoft program to another. It does this by hiding the program in memory, then loading the new programs and resetting the pointers so that the programs are one. There is an Applesoft variable table lister. This can be helpful if you are trying to speed up your program and need to know if the beginning entries are the most often used.

GALE is very memory intensive. While it is transparent when in use, it generally resides between the DOS buffers and your program. While it matters little on 64K machines, it lowers the memory storage on 48K machines by 10.75K. This could be a problem when running large programs, and may be a reason for choosing one of the smaller competitive editors. Another problem you should be aware of is that the programs often don't run properly unless the editor is unhooked.

In sum, this package is a very good editor, offering enough features and ease of use to justify the price. An editor like this, light years ahead of our built-in BASIC editor, is an important piece of software for anyone doing programming. My only hesitation is over the memory loss for owners with 48K Apples. Owners of 64K machines will find this editor more than adequate for their programming needs.

GLOBAL PROGRAM LINE EDITOR

Beagle Brothers Micro Software, Inc.
$49.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	B+	*Value for Money*

Global Program Line Editor is an enhanced version of the original *Program Line Editor*. Besides having one of the most versatile line editors for editing BASIC programs in either Applesoft or Integer, this version includes features that do global search and replacement within an entire program. The utility also supports lowercase and five of the most popular 80-column cards. And those that have language cards may choose to relocate DOS onto the card, and place the *GPLE* in the second memory bank.

The *Global Program Line Editor* is placed into memory between DOS and the I/O buffers. Essentially, HIMEM: is shifted down 4,096 bytes. While this effectively cuts the maximum memory available to your BASIC program by 4K, the convenience of having the extra features is often worth it.

Normal editing commands are accessed by a Control-E, followed by a line number. This displays the line in 40-column format, ready to edit. Other commands allow you to go to the beginning or end of the line, insert or delete characters, pack the line if it is too long, find a character within a line, and re-edit the line if you've ruined it (a lifesaving feature). One of the newest features allows you to re-edit an Integer BASIC line that was not entered properly because of a syntax error. One of the best features of the editor lets you enter the line regardless of your cursor position, or whether or not you have edited the line, by a simple carriage return.

The global features enable you to specify a range of lines to edit and search for a specific string throughout an entire program, or just within a range of lines. The global replacement feature simplifies the mass change of variable names within a program. The search can be made when you monitor each replacement, or in an automatic mode.

The utility has a built-in set of macros accessed by the Escape key. The program comes with a predefined set using nearly all of the 1,152 available bytes. These include functions that will make a list and catalog a disk automatically with one keystroke. Others clear the screen, enter the monitor automatically, return the computer to page one, and calculate the start address of the last BLoaded file in memory. Escape functions can be created with limitless possibilities.

GPLE is an outstanding utility, thoroughly documented in a thirty-two page manual. Its two best features are its logical command structure and its extreme ease of use. It is almost a necessity to anyone who does an extensive amount of BASIC programming.

LISTMASTER

Roger Wagner Publishing, Inc.
$39.95
48K; II/II+/IIe

Overall Rating	A	A	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A	A	*Value for Money*

Listmaster is a utility disk that contains four extremely useful programs for Applesoft program development. Authored by Ted Birkhead and Roger Wagner, the programs and their features are as follows:

1. Appleseed. A program optimizer that gives the user the option of shortening variable names, combining program lines, stripping out REM statements, and renumbering a program by ones. This both shortens a program and optimizes its execution speed. It may be used as a pre-compiler.
2. Renumber Plus. A renumber utility that offers the option of specifying parameters and specific blocks of code for renumbering. It allows the user to retain the logical structure of a program when desired, and preserve logical blocks of number for routines.
3. Lister. A program that facilitates neat and orderly program listings, allowing the user to specify name and date banner, top, bottom, left and right margins (even if your printer does not support these functions). It also provides a means for creating a text file of any Applesoft program for processing by a text editor. Lister also supports transmission over a modem with the proper utility software.
4. Comp-List. A utility that will make a comparison listing of two Applesoft programs stored as text files and print out or store as a text file (your choice) the difference between them.

The programs are well done and very useful. The accompanying documentation is well written and easily understood. Error handling is very good, with documented error codes for *Renumber Plus*. An excellent addition to your utility library at a very reasonable price.

SHORTCUTS

Penguin Software
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

ShortCuts adds extra commands to Applesoft BASIC by using the "&" command. You can use it with other programs that employ the "&" command and with the Apple computer's program editors, such as PLE or RENUMBER. *ShortCuts* adds power to your Applesoft programs and saves time in programming. It also enables you to give your software a polished, professional look.

Each *ShortCuts* command borrows an existing keyword from Applesoft, such as Print, Save, PR#, and so on. It does this because Applesoft keywords are stored in one byte, while other words take one byte per letter. By using keywords, *ShortCuts* saves two to six bytes per command. The forty-eight page manual that comes with the program documents all the commands.

ShortCuts comes with a tutorial called Sampler that illustrates some of the program's basic features. It lets you act the role of a user while showing the actual commands executed. The upper half of the screen displays the program loop being run, while the lower half shows the program loop running. Sampler begins by showing you INPUT functions for the three types of Applesoft variables: string, real, and integer. It also shows you how to use *ShortCuts* to validate input and display meaningful error messages, and illustrates the use of fully formatted input (which allows you to enter telephone numbers). Calculator, another demo, turns your computer into a visible calculator that uses a number of *ShortCuts* numeric formatting features. Address Book shows you how to use *ShortCuts* to fill data screens with input from the keyboard and disk. By listing and examining these demonstration programs you learn the power and applications that *ShortCuts* offers.

ShortCuts, like all utility programs from Penguin Software, comes on an unprotected disk. I commend them for this practice, and strongly recommend that you purchase this program if you program in Applesoft BASIC.

UTILITY CITY

Beagle Brothers Micro Software, Inc.
$29.50
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B+	*Value for Money*

Utility City is a collection of twenty-one utilities, some more useful than others, that assists Applesoft programmers. While some have been around for years in the public domain, a few are new. The authors assembled what they felt were the most needed utilities, and did it at a reasonable price. The programs can be divided into several categories. I will try to describe their content as well as give a critique of each.

There are a number of Applesoft utilities that enable the programmer to hide critical code from prying eyes. While these utilities don't prevent others from copying the material, they sure puzzle other programmers who wonder how it was written. Command Zap allows invisible commands or Rem statements in your program. It is simply done by control H's (backspaces) in the program. However, this only works while listing to the screen. Paper printouts show the ruse rather quickly. There is also a similiar utility called REM Zap that works just with Rem statements, and one called File Name Zap that can hide program names in the catalog. Another program called Bigliner renumbers Applesoft programs to lines above 63999 so that they are inaccessible to most people.

One of the more practical utilities, called Screenwriter, helps you format text screens that can be saved to the disk and then Bloaded for later use. You can create layouts that include normal, flash, or inverse lettering. Text can be right justified or centered automatically, or even moved as a block. One nice feature is a flashing Hi-Res grid that can be superimposed over the text to help you with the formatting. All formatting and commands are made through control characters. The documentation implies that cursor movement without typing is with the two arrow keys and the A and Z keys, but what works are the control A and control Z keys.

The package includes a utility for decimal-hexadecimal conversion that doesn't interfere with your current program. The program is Execed into memory in a safe place, performs a few quick calculations, then returns you to your program. There is a program called Double Loader that runs another utility in memory without destroying the first. Another called Int Converter converts an Integer BASIC program to Applesoft without checking syntax. Connect allows you to join two Applesoft programs together as long as the range

of line numbers doesn't overlap. Line Search helps you locate any particular Applesoft line in memory. It actually is only useful if your program has been somehow garbaged, although several people who understand the tokens have created illegal lines. Sortfile sorts alphabetically and stores a list of items on a disk. It is good as a small database for a list with one or more fields. However, this program can only sort on the first few letters of a single line.

There are two catalog utility programs on the disk. Multi-Cat allows you to list programs several columns across to the printer or screen. The format is user specified. Key-Cat allows you to select and run programs with one keystroke from your catalog. It also gives the amount of free space on the disk.

Xlister is a utility to produce easy to read Applesoft programs either on screen or to the printer. It separates multiple statement lines into separate lines. There are even page breaks. And finally, there is a Text Dump program that will dump whatever is on the text screen to the printer. It is appended to the end of your program and accessed via a Goto 63900.

This brings us to the subject of documentation. While errors and changes are usually provided as an errata sheet, the authors resort to a program called Buglist on the disk for this information. They missed a few. On the whole the documentaion is good and is the final part of Tip Book #3, a booklet of some good and some useless programming tips. The authors also include a chart of useful Apple memory locations.

THE WIZARD'S TOOLBOX

Roger Wagner Publishing, Inc.
$39.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	A	*Value for Money*

The Wizard's Toolbox is a comprehensive utility for the Applesoft programmer that offers a simple method of incorporating one or more machine language subroutines in your Applesoft program without the usual problems of memory allocation and passing of variables. No knowledge of machine language programming is required if you choose subroutines from the included library or from other available sources. Simply load your program, add a line of code, BRUN *The Wizard's Toolbox*, and append the desired subroutines by specifying their filenames and the names by which you wish to access them. That's it. You can now run, modify, and save your program without concern for the appended machine language subroutines and interfacing code.

The library of routines includes general purpose command subroutines which extend Applesoft as a language such as "Print Using," variable "GOTO" and "GOSUB," general string input, and a useful text output that avoids word breaks. Special purpose routines are also provided, such as turtle graphics, shape table processors, sound effects, array search, bubble sort, and data statement pointer control. A few useful utility routines, such as a fast BLOAD subroutine, complete the library. Three additional libraries, available at $49.95 apiece, enhance array manipulation, screen display creation, and chart graphics.

The instruction manual is well written, but initially intimidating at over 120 pages. Fortunately, you only have to read four pages to get started and another one or two pages for each subroutine description. The balance of the manual describes other capabilities available from the menu, gives a description of how the program works, and reprints a lengthy section on variable interfacing which appeared in *Softalk*'s "Assembly Lines" series, and was obviously written for a wide range of skills.

Bonus features available from the menu include the capability to search for ampersands, inspect (and modify) Applesoft lines in tokenized form in memory, and display a memory map in tabular form. Another bonus: you can make three backup copies from the protected disk (however, all subroutines that you need in your programs can be directly copied). Still another bonus: the special DOS adds free sectors to the normal Catalog output, and long catalogs can be terminated by pressing Return. This special DOS may also be transferred to your own disk.

If your program uses Hi-Res (page one), the total program length should be limited to about twenty-four sectors, including the appended subroutines and the interface routine. The internal memory map display makes it easy to avoid memory conflicts, and the compact nature of the subroutines minimizes memory requirements. However, the potential for crashing into page one does exist.

All in all, it is excellent software with nearly as excellent documentation. If you need the speed of machine language, but want the ease of revision offered by Applesoft, or don't program in machine language (or don't own a good compiler), take a serious look at this one.

THE WIZARD'S TOOLBOX
Database Toolbox
Chart & Graph Toolbox
Video Toolbox

Roger Wagner Publishing, Inc.
$39.9 5
48K; Apple II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

This versatile programming utility allows you to incorporate Machine language subroutines within your Applesoft programs. It also permits variables to pass back and forth between the main Applesoft program and its Machine language subroutines as easily as within Applesoft itself. With *The Wizard's Toolbox* you can create programs that combine the speed and power of Machine language with the simplicity and convenience of Applesoft BASIC.

More than just a library of miscellaneous routines, *The Wizard's Toolbox* and its companion Ampersoft Program Library disks actually extend Applesoft to a degree approaching an entirely new programming language. *The Wizard's Toolbox* lets you write Applesoft programs in a new and remarkably efficient way, using already written modules that accomplish a specific purpose. You invoke each module with a one-line command—far simpler than employing (much less writing) a complex Applesoft subroutine to do the same task. The program solves all the problems of putting Machine language code into programs, but does not require knowledge of Machine language programming. It makes the routines accessible by allowing you to choose from a professionally written library or many others published in magazines. You can invoke routines from your Applesoft program with the ampersand vector, using names you choose. You need never concern yourself with BLOADs, the locations of the routines in memory, or with protecting routines during the running of the program.

The Wizard's Toolbox includes thirty-one routines of a general nature. For more specific applications, *Database Toolbox* offers thirty-eight concerning array manipulation, sorting, searching, and disk access; *Chart & Graph Toolbox* provides twenty-seven new graphics commands and nine routines; and *Video Toolbox* has nineteen commands and nineteen routines to facilitate full screen formatting. *The Wizard's Toolbox* disk also contains a program to remove *The Wizard's Toolbox* and a utility to link blocks of non-relocatable routines to your *The Wizard's Toolbox* programs. The back of the disk contains a number of demonstration Applesoft programs and provides insight into some of the possible uses of the routines provided plus others available elsewhere.

If you have excessively long Applesoft programs for the functions listed above, or if you get bogged down in array manipulation or graphics tricks, you need this software. *The Wizard's Toolbox* and its accompanying library simplify the writing of all programs, not just long ones. It shortens long programs because of the compactness of Machine language routines. The brief demonstrations offer useful examples of the power available in a Machine language library. *The Wizard's Toolbox* is easy to do and undo, and Roger Wagner Publishing, Inc. backs up their software with a satisfaction guarantee or your money back. Commercial programmers might be interested to know that no one prohibits the sale of works created using *The Wizard's Toolbox*. The only limitation you face is the number of routines in the library or published in magazines. While extensive, the library will surely not contain every function you might need. In that case, you will have to solve your problem in Applesoft.

Three Applesoft Compilers

THREE APPLESOFT COMPILERS

Applesoft Compiler TASC Expediter II+

Applesoft is the most popular language available on the Apple II computer. Because it is an interpretive language (one that requires a machine language program to supervise the execution of each individual BASIC line as it is used), it is rather slow when compared to the equivalent program in pure machine code. This is because the interpreter must scan the user's program while actually running in order to find the appropriate subroutines to do that chore within its own program code. In addition, it must scan the user's program for the next statement whenever it finds a branch instruction in a Goto or If statement. A better solution is to use a compiler to translate the BASIC program into machine code beforehand. That way the program will run much faster, because the scanning and decoding of the user's program is done only once, during compile time.

Three separate software companies are marketing compilers. They all compile Applesoft BASIC programs into object code that runs much faster than interpreted BASIC. Speed increases vary widely, and are often dependent on the structure and length of a user's program. In general, long programs using a large number of variables, and doing a great deal of logical branching within the program, will execute much faster as compiled object code. Programs that primarily use integer variables will also run considerably faster, if compiled by a compiler that offers an integer option. Users can expect overall speed increases of between two to ten times that of interpreted Applesoft.

Another important point, and one too often neglected by consumers, is the size of the final object code. All compilers expand the object code somewhat from the size of the original program. Machine code, by its nature, uses more memory than an Applesoft program, so you must bear in mind the tradeoff between speed and size. In addition, they all require run-time libraries. These range from 2K to 4K in size. Moderately large Applesoft programs, say of 45 sectors (10K), will expand to 20K or more depending on the compiler. It is highly likely that you will not be able to compile some programs due to lack of memory space.

There are a substantial number of differences between the compilers. Their handling of strings and variables differ widely. Some allow common variable space to make chaining possible between programs that are too large to compile in one chunk of code. All offer options through the use of "active" REM statements to control the placement of compiler code, to avoid interference with the Apple's high resolution graphics pages, and to allow certain variables to be evaluated in true math. Because all of the compilers have their own peculiarities and individual ways of handling the compilation, they are described in much more detail below.

In Microsoft's *TASC*, the user controls the locations of three memory compartments: the run-time library, the program itself, and variables. In the default order of things, the library sits at decimal 2051, the program follows directly at 6020, and variables occupy the space between the top of the program and himem. Numeric variables build upward from the top of the program, and strings build down from himem. Lomem statements in the source program are not compiled, because the bottom of the variable space is defined at compile time.

If you want to avoid clobbering areas of memory with your program, you can designate a starting address other than 6020. Either enter a specific number, or type HGR1 or HGR2 to begin your program at the first byte following either of the Hi-Res pages. The program itself must be a contiguous block in memory; *TASC* will not Jmp it around areas that you want to protect.

If you specify an alternative location for the library, you will need to take note of its new address, because the library must be Bloaded separately from the rest of your object code at run-time.

To allow modularization with shared variables, *TASC* employs commands embedded in REM statements in the source program. The statement REM ! Defcommon A,B,C would be ignored if the program was run through the interpeter. But it would instruct the compiler to allocate memory for three numeric varia-

bles in a protected global variable area. Other modules could gain access to these variables by means of a REM ! Usecommon statement in their source listings. Defcommon initializes global variables while Usecommon refers to them without reinitializing them.

All modules that use a particular set of global variables have to be compiled with the same starting address for program space, because *TASC* allocates its common variable area at the beginning of this space. The global block is subdivided into two parts to separate numeric globals from string globals. Modules that call upon common variables do not have to use the same variable names. One module could define common variables A, B, and C, and another could access those same variables under the names D, E, and F. What matters is the order in which these variables are declared in the source's REM statements.

Within the common block, *TASC* allocates two bytes per integer and five per real, and it expects the programmer to keep track of what kind of variable lies where. The compiler will check to see that each module is declaring the same overall amount of space in each of the common subunits, but it won't prevent the programmer from trying to use ten bytes of storage as five integers in one module and as two reals in another.

Hayden's *Compiler* takes a somewhat different approach to memory allocation. In the default configuration the program is on the bottom of things, at decimal 2051. This block is followed first by variables and then by strings. The strings build upward from the top of the variable compartment toward a default himem of hex 9600.

In this default scheme, the compiler draws on a library of ready-made subroutines, and includes them as needed within the program space. You have the option of bringing the entire 3.3K library into memory as a separate compartment, external to the program space. Presumably, this would be an efficient, space-saving thing to do only in cases where you were going to keep several compiled modules in memory at once to be called from an Applesoft program.

Variations from this default memory scheme are effected by means of an "active REM" statement, which must be the lowest numbered line in the source program. Allocating memory areas from within the source program rather than at compile time may seem like a little extra hassle, but it has the advantage of leaving you a convenient record of what you've done.

Hayden offers you the following allocation options: *B* specifies the starting address of the program; *X* summons and locates the optional external library; *L*, for lomem, specifies the beginning of the variable space; *S* declares the bottom end of the string pool; and *C* may underline the program space if you choose.

Separately compiled modules may share variables by declaring the same lomem. As with the Microsoft compiler, Hayden's global variables do not need to bear the same names. What matters is the order of declaration, and it's up to you, the programmer, to keep things straight. Since Hayden, unlike Microsoft, does not wall off a separate common variable block in memory, all the variables of at least one of the modules must be shared.

To avoid an implicit clear that would reinitialize shared variables, modules may be called at their starting address plus two. Hayden's manual recommends calling at the base address plus two, even if there are no variables in the called module, as a way of saving executing time.

At least two things are worth noting about Hayden's approach to string allocation. First, strings build upward toward himem rather than down and away from it. This wouldn't be possible with an integrated Applesoft program because the variable space growing up from lomem is dynamically allocated. In a compiled program, all data spaces are static, so the compiler can set the low end of the string without fear of encroachment from the variables below. According to Hayden's manual, the upward building approach was chosen for two reasons: it lends speed to the concatenations and arithmetic string operations, and it permits the user to alter himem from within the source program.

The second, and perhaps more important, point about Hayden's strings is that no housecleaning takes place. If you want to compile a sizable program with a lot of string handling, you will need to sprinkle some FRE() statements into your source code, or you may find yourself out of memory.

Einstein's *Expediter* arranges memory in the following manner: a 2K run-time library occupies the space from hex 800 to hex 1100. The library is not relocatable; however, it may be BSAVEd and BLOADed separately from the rest of your object code as a means of conserving disk space (the normal procedure saves the entire library with every compiled program). The program itself, in the default arrangement, rises out of hex 1100; any other address above 1100 may be selected instead. Variables, both local and global, work their way downward from himem, which defaults to hex 9600. Either group of variables can be located elsewhere in the user's options.

As with *TASC*, *Expediter* users declare global variables by means of active REM statements in the source program. The procedures are a little different, however. In *TASC*, all Defcommon or Usecommon statements have to appear at the front of the program, before any non-REM statements. In *Expediter*, the REM <G> and REM <L> commands act like switches and can be used at any point in the program. All varia-

bles following a REM <G> statement before the next REM <L> are global variables; all variables following REM <L> are locals, and so on. As with other compilers, the programmer must keep track of the order in which global variables are referenced.

Strings in *Expediter* are handled in one of two ways. At compile time, users can specify either static strings, which are useful for passing variables between modules, or dynamic strings, which are much faster. When static strings are specified, the user dimensions them at compile time. The default value is 40. This figure can be overwritten globally, through a compile time option, or for individual strings by means of active REM statements in the source program.

Another option at compile time allows the user to protect up to ten areas of memory. This makes for an easy, space-efficient way to avoid clobbering the Hi-Res pages, shape tables, or whatever else you may want to protect. With this approach, you don't have to worry about relocating entire blocks of code; essentially, you simply tell the compiler how high and it will JMP.

Arithmetic Lesson. So much for matters of memory allocation and communication between program modules. There are some other important differences among the compilers.

Microsoft's *TASC* and Hayden's *Compiler,* for example, will perform true integer arithmetic upon integer variables. Here's how this works. Applesoft allows you to declare integer variables by adding the percent sign to the variable name. When the interpreter works with your integer variable, it first converts the value to a real and then performs its customary floating point arithmetic. So, actually, you slow down your program in effect by declaring integer variables, because the values have to be converted before becoming useful as operands. The only place where declaring integer variables appears to be advantageous is in large arrays: there the savings in memory space (two bytes per element instead of five) may offset the drag on computation.

TASC and the *Compiler* will perform integer arithmetic to the extent they can. The *Compiler* will treat all numeric variables as integers until it encounters a real quality or an operation requiring a real operand, at which time it will convert. *TASC* will treat all variables declared as integer variables, and rather than making you rewrite your source program to put in all those percent signs, it provides an active REM option that converts real variables into integer variables.

One of the limitations of Applesoft is its refusal to use integer variables as counters in For...Next loops. You can't even write For I % = 1 To 10 without getting a syntax error. The REM! Integer feature in *TASC* allows you to overcome this restriction, and the *TASC* manual strongly urges you to use it, claiming that loops with integer counters may execute up to two times faster than loops with real counters.

It isn't clear from the manual whether Hayden's *Compiler* uses integer arithmetic for loop counters. But judging from the results of our simple loop test (in which *TASC* aced out the usually faster Hayden compiler), it appears that it does not.

Obedience Is Perfect In None. Not every Applesoft command has been implemented by these compilers. In particular, since the compilation eliminates the need to have source code in memory, the commands Del and List have been ignored by all four compilers. Cont was passed up by everyone but Hayden: all it does in deferred execution is hang up your computer, but if you want to put it in your source code, *Compiler* will compile it.

New, which seems like a candidate for exclusion, was implemented by all four compilers. In a compiled program, New clears out any Applesoft code that might have been lurking in memory, without affecting your object code or variables. Oddly enough, Hayden's *Compiler* requires you to terminate the source program with New rather than End. Your Apple may behave peculiarly if you don't.

Commands relating to cassette use (Save, Load, Recall, Store, and Shload) have been almost universally ignored. The only exception is *Expediter*, which includes Shload.

Trace and Notrace were excluded from implementation by Microsoft and Hayden on the reasonable grounds that debugging should be done with the interpreter before the program is compiled.

Users of *Expediter* have the option of enabling line tracing features, but at a considerable cost in code size and execution speed. The overhead of *Expediter's* line trace option is seven bytes per source line, in return for which you get error messages, stops, and Ctrl-C breaks identified by program line number. You also get to Trace in deferred execution.

The two compilers that did not implement Trace and Notrace did implement Resume. With *TASC*, there's an option available at compile time that will enable the compilation of Resume. The price is three bytes for every source statement capable of generating an error. If the source program does not use Onerr Goto statements and the Resume option is selected, run-time errors will be reported with line number, making this feature useful as a debugging tool.

With Hayden, the support of Resume is automatic. If the compiler encounters a Resume, it generates an additional three bytes for every statement in the source program.

The Dimensions Of It All. Dimension statements are handled differently by all four compilers than by the Applesoft interpreter. All arrays are dimensioned stati-

cally, which means that Dims with variable arguments will not compile, and only one dimension statement is permitted for a given array.

With Hayden and Microsoft, the latter constraint also applies to defined functions. These compilers will permit only one Def fn statement per function name. *Expediter*, on the other hand, treats Def fns exactly as they are treated by the interpreter.

One other interesting tidbit: *Expediter*, since it uses static string allocation and does not require the collection and disposal of garbage, has redefined the Fre token. Fre (x) in an *Expediter* source program will, on compilation, return the address of variable X.

Of the three compilers, Microsoft's *TASC* is the most disk-based. Each of three compiler passes has its own large binary file on disk, and there is constant I/O activity during the compilation process. As a result, *TASC* takes more time to compile a program than any of the others; a large program may take as long as twenty minutes.

During pass one, the compiler acknowledges active REM statements and displays the source line, and points to the offending syntax. At this point, you have the option to continue pass one to find any additional errors. Non-fatal errors—syntax that cannot be compiled, like an extra colon or a statement following on the same line with a Goto—get a beep and a warning.

After compilation, *TASC* displays the ranges of each memory block: library, program, local and global variables, and the compiled addresses of each source line. A Ctrl-D PR#1 command at the start of compilation sends all of *TASC*'s output to the printer.

Hayden's *Compiler* does its work quickly, though it has to go to disk occasionally during the process. Curiously, though the compiler sends the screen a running account of its every activity, it doesn't provide a convenient way to record this output on paper. At the end of the compilation, your screen will show the addresses and lengths broken down as follows: literals, constants, main code, runtime modules, end of binary file, scalar space, array space, string pool, and initial himem. Questionable or faulty parameter specifications show up on this map in inverse video.

Expediter displays or prints a running list of source program lines and compiled addresses. The same list includes the locations of all variables as they are compiled, and the amount of source code remaining.

At the end of the compilation, statistics are displayed or printed: a symbol table, the start, end, and length of procedure, global data, and local data; the number of lines compiled; the number of variables; the number of data statements; the amount of temporary storage used by *Expediter*; and the number of forward references resolved during the compiler's final pass. The compiled code may be unreliable if the last figure exceeds 600. *Expediter* now has an option to pause on fatal errors; otherwise, the compiler merely identifies them and moves on.

Conclusions. All of the compilers perform as advertised. For general use, and for programs involving heavy floating point calculations or integer variables only, our recommendation would be to try Microsoft's *TASC* compiler. While it's not the fastest compiler, it usually has the most compact object code, it is the easiest to use (especially when declaring local and global variables for chaining programs), and it comes with excellent documentation. Its only major drawback is that it compiles programs very slowly.

Both Einstein's *Expediter II+* and Hayden's *Applesoft Compiler* produce slightly faster code for all but those programs using an extensive amount of integer math. *Expediter* excels in string manipulation. Yet they are both less convenient to use than *TASC*. They require much disk-swapping on one-drive systems, and Hayden's requires a system boot before every compilation. Code expansion is normally more than double with both programs, although there is a memory compression option on the new *Expediter* that can produce object code only 1.5 times the length of the original Applesoft file. Large Applesoft files may or may not be a problem with either compiler.

In sum, do not expect any Applesoft compiler to provide the best of both worlds. You sacrifice size for speed, or vice versa. They are helpful in programs that are marginally slow, but cannot help games that need to run in Real Time. For help in this area you will need to learn to program in Assembly Language.

Adapted from an article in *Softalk Magazine*.

Languages and Language Accessories

APPLE III PASCAL UTILITY LIBRARY

Apple Computer
$75.00
256K; Apple III

Overall Rating	C+	A-	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	C	D	*Value for Money*

What a difference a couple of years can make. When this product first came out in 1981, I would have given it all A's and B's. However, in the intervening years a number of books have appeared (with the examples on disk) which aim at the same market and do a better job of exposition.

The *Apple III Pascal Utility Library* consists of two disks and a booklet which I hate to call a manual because of the minimal prose. It is instead a reference guide to the routines on the disks, grouped into three Pascal UNITs: general utility, file access, and B-tree manipulation. Probably the best is the file access module. The general utility routines are somewhat primitive compared to similar packages. The B-tree module, while well done, borrows freely from Wirth's *Algorithms + Data Structures = Programs*, as the author admits. Mr. Eckhaus says that he aimed his work at experienced Pascal programmers, but I would amend that to moderately experienced Pascal programmers. For them it could serve as an educational tool. I doubt the program offers much to the truly experienced Pascal programmer. In addition, I found nothing specific to the Apple III. The program could teach you something if you want to learn a little about UCSD Pascal—but probably not $75 worth.

BASIC 16

Arrays, Inc./Continental Software
$99.95
64K; II/II+/IIe/IIc

Overall Rating	A	A-	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

BASIC 16 is a BASIC interpreter that allows you to make full use of the new 65c802 and 65c816 microprocessors from Western Design. Along with the disk and documentation, the package includes a 65c802 cpu which you substitute for the 6502 on your Apple's motherboard. The advantages of upgrading your computer's central processing unit are many and great, especially for software developers and programmers. In addition to much greater speed of operation, the new 16-bit processors give you a vastly expanded command language (256 opcodes, 108 instructions, and 24 addressing modes) and memory-addressing capacity (16.8 Megabytes). The actual substitution is simple. You use a screwdriver, teaspoon, or other easily available small tool to pry out the old chip and then insert the new one. The 65c802 is completely pin compatible with the Apple's old 6502, so you will face no hardware problems whatsoever.

The good news about *BASIC 16* is that it improves as much on Applesoft as the 65c802 does on the 6502. The command set resembles Applesoft's, so it's easy to make the transition, but the language betters and extends Applesoft in a number of ways, including more commands, better accuracy, a macro capability, and numerous additional features that permit a far more structured approach to BASIC programming than is possible with Applesoft.

Perhaps the most exciting new structure in *BASIC 16* is the "IF...THEN...ELSE" statement which fills a longstanding gap in the logical capabilities of Applesoft. This statement is used in the following format.

```
IF (conditions) THEN (statements) : ELSE
```

For example:

```
IF X=Y THEN PRINT "X=Y": ELSE PRINT
X<>Y
```

BASIC 16 also includes far more powerful screen formatting commands than Applesoft, including simple commands for creating up to four simultaneous screen windows, as well as enhanced and expanded tab functions. An excellent implementation of PRINT USING permits the acceptance of input in a variety of formats. Another improvement is the greatly increased accuracy of the floating-point arithmetic routines. If you've ever tried to write an accounting application in Applesoft and found that your totals were inevitably a penny off, you will welcome *BASIC 16*.

BASIC 16 is almost one hundred percent Applesoft compatible. Practically all software written in Applesoft will run without modification under *BASIC 16*. So will most programs that incorporate assembly language routines.

The package includes *BASIC 16* on a disk, a 65c802 chip, and the documentation. Considering that the chip alone is worth nearly the value of the entire package, it's quite a bargain. The documentation consists of a tutorial and a reference section. The tutorial is a good introduction to structured BASIC programming, and the reference section allows you to find the information you need as you need it. For an additional $24.95 Arrays will send you the source code for the *BASIC 16* interpreter, allowing you to modify it if you wish. The publisher encourages programmers to modify the source code or to include additional routines. Quality routines submitted to the publisher will be included in future versions, credited to their authors.

All in all, *BASIC 16* is a high quality interpreter, a considerable improvement over Applesoft, that makes the hardware upgrade worthwhile. *BASIC 16* will also run on the new 16-bit upgrade cards from Checkmate Technology and others.

LAZER PASCAL

Lazerware
$39.95
64K; Apple II/II+/IIe/IIc

Overall Rating	C	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C-	C-	*Value for Money*

Lazer Pascal is a curious mixture. On the one hand, it bears a strong resemblance to standard Pascal. On the other, it seems to be a machine language/monitor program. Be advised that in the first instance it is a "tiny Pascal." Some of the more common features of a full Pascal are missing: no real numbers are allowed, no Type definitions are permitted, and no records or sets are allowed.

The author of *Lazer Pascal* defines the language as "a systems programming language." He further states that "it is not intended for applications, business, or scientific programming." This is a fair assessment, but not something you would expect to find out after you had purchased the program and started to dig into the voluminous and hard to follow manual. Another surprise awaiting the purchaser of *Lazer Pascal* is the sales pitch given for another product by the program's author. *Anix*, an operating system, is "highly recommended," and the manual for *Lazer Pascal* "assumes that you know how to use" that system.

Included on the two-sided disk are the compiler and a simple editor for creating Pascal source programs. Incidentally, the manual for the editor fails to disclose how one terminates an insertion, and you won't get very far if you don't know how to do that (try Shift-Control-P). System programmers may indeed find some value in this language, especially the extensions that have been added which permit examining memory addresses directly from a Pascal program. The average Apple user probably won't get very far with these extensions.

LINKDISK

Link Systems
$69.95
48K; language card, UCSD System 1.1

Overall Rating	A-	A	*Reliability*
Ease of Use	C+	A	*Error Handling*
Documentation	C+	C	*Value for Money*

Linkdisk is a basic disk utility for those using the UCSD p-System. The sectors of a Pascal formatted disk can be read, displayed and modified. The contents

of each Pascal block (two sectors) can be displayed as hex or ASCII or both on the screen. The screen can then be modified, and the new version stored back on the disk. A feature of this program is that it can "translate" Applesoft BASIC text files to Pascal format text files. To aid in this, the program will read and display DOS 3.3 disk catalogs.

This utility comes as a code file to be used with the UCSD p-System 1.1. The command lines all follow the UCSD convention of presenting one letter commands across the top of the screen. The thin manual with the disk documents the commands in the program, but doesn't cover any details of the directory format, or give any detailed examples of its use. All documented functions work and no errors were detected during testing.

This program would be useful to a programmer using the Apple UCSD p-System. Without outside documentation, it would be difficult to use this program efficiently to repair damaged disks. The state of the art in disk utilities has progressed to the point where displaying and modifying the disk is automatically assumed. This program is most useful on disks that are abnormal in some way, but there are no features that would help you recognize or restore damaged disk directories. However, a damaged disk directory can be reconstructed by using *Linkdisk* to find all the files on the damaged disk, and then entering them in the missing directory yourself. There should be some help from the utility program to do this. The program is difficult to use given the state of the documentation that arrives with the Apple Language Card system.

LOGO

M.I.T., Distributed by
Terrapin, Inc., and Krell Software, Inc.
$89.95
64K; Apple II+/IIe/IIc; Franklin

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Logo is a computer language that incorporates a new philosophy of education that allows experimentation and provides immediate response without much, if any, formal instruction in the language. *Logo* has been under continual development from 1968, under the sponsorship of the National Science Foundation, largely conducted at M.I.T. in the Artificial Intelligence Laboratory and the Division for Study and Research in Education.

Logo is a "user-friendly" language that can be readily learned by even an inexperienced student, yet can provide the most sophisticated programmer with the power of a recursive, procedural, modular, interactive language. It is all of these things and more, by design.

From a child's point of view, *Logo* is a drawing board with a triangular pointer sitting in the middle of the screen, pointing upward. The adults want to name that object the "turtle"—silly grownups. If the child types Forward 100 and presses [Return], the turtle moves up the screen and leaves a line behind that is about ten times its own length. If the child now types Forward 100 Right 90 and presses [Return], the turtle will turn to the right and leave another trail behind. If this process is repeated, the child will have drawn a square.

If the child is shown how to use the word Repeat, and starting with a "clean" screen by entering Draw, types the following line: Repeat 4 (Forward 100 Right 90) and presses [Return], the turtle will move on the screen and draw a square.

If the child is allowed (or encouraged) to try different numbers for the lengths and angle measures and repetitions, the observer will see the true intent of such a language. A child will immediately experiment with this simple-to-use program, even if the child is a greying, 40-ish teacher of High School Academic Mathematics and Computer Programming.

As sophistication and curiousity grow, the user will investigate the possibility of writing "procedures." This is a simple task. Keeping with our example, to create a "procedure" we need only type To Square and press [Return], and we are placed in the Edit Mode where we can type our line: Repeat 4 (Forward 100 Right 90), and (following the instructions at the bottom of the screen) press Control-C. From that point on, to draw that square, we need only type Square and press [Return].

Now we are progressing. It gets boring continually redrawing the same square. There should be a way to extend this idea and draw more squares, different sized squares, other figures besides squares, etc. This, of course, is the point of the educational philosophy that generated the *Logo* language. The language is capable of using local and global variables, and to allow the calling of a procedure from within itself. This recursive feature, and the ability to pass variables to other procedures within the same workspace, makes the language comparable to some high-level computer languages.

Logo's list of primitive commands includes many graphics commands, such as Back, Forward, Draw, Clearscreen, Background (to change background color), Heading (to move the turtle relative to its current heading), Left, Right, Pencolor (to chance the color of its trace), Penup and Pendown (to leave a trace or not),

Hideturtle (not to show the turtle at all), Setheading (an absolute positioning), Setxy (moving the turtle to an absolute location), Setx or Sety (moving the turtle to a particular X or Y location), Splitscreen or Fullscreen (this provides the two possible types of graphic screens), and Towards (positions the turtle at a specified X-Y point on the screen). Yet *Logo* is not simply a Graphic Turtle-Geometry language. That is the deceptive part of the ads proclaiming its arrival. *Logo* also provides many numerical commands. These include addition, subtraction, division, multiplication, Atan (this outputs an angle between 0 and 360 degrees by finding the Arctangent of two lengths, where the sign indicates the quadrant), sine, cosine, Sqrt (the squareroot of positive numbers), Integer (which truncates any fractional part), Quotient (of integers), Random (repeated output), and Round (which performs the correct integer rounding of positive or negative numbers), among others.

Logo also has commands that involve manipulating words and lists. These can provide string operations comparable to those in many BASIC dialects, but without the usual complex syntax. For example, to output the string Out There from the string Hello Out There you type: Butfirst [Hello Out There]. If the string in the brackets was the word Hit, the output would be HI. Other commands include: Butlast, the counterpart to Butfirst; First and Last, which output the first or last word or character of a word or list; Sentence and Word, which takes a variable number of inputs (lists or words, respectively), and outputs a concatenated list or word; and List, which takes a variable number of input words and creates a list, to name the most common commands. *Logo* also has a full complement of conditional expressions, their predicates, and procedure execution controls. These include the If...Then...Else construct (sorely missed in Applesoft), Test...Iftrue...Iffalse, Allof and Anyof commands (counterparts to conjunction and disjunction), Not (negation of a condition), greater than, less than and equal to signs. List?, Number?, Word? and Thing?, Go (which provides branching to a labeled line within a procedure), Output (passes an input to the calling procedure), Repeat, Run (takes a list as input and executes it as if it were a command line), Stop, and Toplevel (aborts all procedures and returns to the top level of command).

Logo has commands that can easily create and edit procedures. For example, Edit, with the auxiliary commands All, Names, and Procedures, enters into the editor mode to allow the use of a powerful full-screen editor which modifies, corrects, and defines one or more names or procedures. This allows the use of fifteen editing commands, most of which are also available at the Command level.

Input can originate somewhere other than the keyboard, and output can be directed somewhere other than the screen. Output, for example, can direct a procedure or command line to a device plugged into a designated slot. Paddle allows 0 to 3 input to go out from 0 to 255, depending on the setting of the specified paddle potentiometer; and Paddlebutton will return True or False if the appropriate button is pressed. Request waits for an input line to be typed and terminated with a carriage return; Readcharacter outputs the "oldest" character in the buffer, or, if empty, waits for an input character; Print and Print1 take a variable number of inputs for onscreen printing, with or without a carriage return, respectively; ASCII and Char take a character or integer input and output the corresponding integer or character; Cursor takes row and column inputs and places the cursor there; Cleartext clears the text screen and homes the cursor; and Clearinput empties the character-input buffer.

Logo handles variables by naming them. Make "PI 3.14159 will give the word PI the value 3.14159. This can then be printed as the line Print :PI. Print Thing "PI will print the value of PI as well, but THING has more general applications.

Logo Workspace consists of all correctly defined procedures, names, and their associated values. Workspace can be stored as files on diskettes; and it is also possible to store turtle-created pictures on the diskette. There are over 16 commands for managing Workspace, including Catalog, Erase, Printout, Read, Save, and Goodbye. *Logo* has other commands to control the distortion that some monitors produce when displaying circles and squares. It alters vertical deflection (.Aspect). Countrpart commands to BASIC's Peek and Poke are also provided. User-provided routines in memory can be transferred. To reclaim unused storage, "Garbage Collection" can be made by using .Gcoll. The measure of free "nodes," the available space in the current Workspace, is made by .Nodes. You can also unlock Apple DOS commands from within *Logo*.

Logo also offers built-in debugging tools. A procedure can be paused during execution by pressing CTRL-Z, or by using the command Pause within a procedure (disengaged by the Continue command). Trace and Notrace are provided for troubleshooting a procedure. Under Trace, each line of a procedure is executed and then waits for any key to be pressed before executing the line.

Logo also offers an extensive list of specific error messages to aid the programmer. These range from diskette problems, such as "The Disk Is Write Protected" or "Disk Error" when a diskette isn't in the drive, to tutorials such as "End Should Be Used Only In The Editor" or "Name Is A Logo Primitive" when the reserved word "name" is used as a variable name.

TERRAPIN LOGO

The Terrapin version of *Logo*, reviewed above, also offers many extra, pre-defined procedures which provide software support for another product they offer, the Terrapin Turtle, a robot. It is a small, hemispherical object, eight by eight by five inches, connected to the computer by an umbilical cable. Your Apple must have a plug-in card and black box. The Turtle Robot has blinking eyes, beeps in two tones, draws on any flag surface with a solenoid-controlled pen, and moves on two wheels which can be independently controlled. It has a sense of touch.

The Terrapin *Logo*, with its series of additional programs for controlling the Terrapin Robot, plus some other utility procedures, lists at under $150. The Terrapin Turtle Robot can be purchased as a kit for under $400, or fully assembled for under $600. The Robot Interface for the Apple costs around $200 (Atari, TRS-80, KIM, Sinclair S-100, and other versions are also available).

This package, as well as the two others reviewed below, offers much to the educator. It is highly recommended for all age groups, providing an almost ideal way to painlessly promote computer literacy in the schools.

KRELL LOGO

Krell Software, Inc., now offers their version of M.I.T.'s *Logo* in two forms. It is possible to purchase the LOGO Language manual alone. Krell's "Alice in Logoland" diskette, and a utility diskette, are available separately.

The above review covers the essentials of the language itself. The LOGO Language diskette is identical in both the Terrapin and Krell versions. The choice between the two packages comes down to whether the utilities, manuals, and other factors can sway a decision. If the purchaser wants all possible utilities, tutorials, and so on, it is possible to purchase the Terrapin version first, and then simply add the "Alice in Logoland" package from Krell. However, many of the utilities are not unique to either version if they originate from M.I.T.

The "Alice in Logoland" diskette consists of twenty-one workspaces which are heterogeneous in quality and usefulness. There seems to be no particular rationale for the ordering of these files. Each relates to a portion of *Alice in Wonderland,* but only superficially. The first lesson, AIL1, "On a Golden Afternoon," purports to introduce the novice to the LOGO turtle; yet it is not a program for beginners. It requires some prior knowledge of the language in order to make sense of what seems like meaningless text on the screen. The second lesson, AIL2, "Down the Rabbit Hole," is actually more suitable as a first lesson, for the turtle is moved about the screen with simple commands.

The third lesson, "Latitude and Longitude," is a simulation of Alice falling all the way through the earth. This demonstration is of questionable accuracy; worse, the demonstration comes without explanation. This is followed with multiple color displays of horizontal and vertical crossing lines on a globe, ostensibly the lines of latitude and longitude. Someone should check on the meaning of lines of longitude. Their representation seems totally incorrect.

The fourth lesson, "Rule 42," is at best a demonstration of quite advanced If...Then...Else programming, illustrated with actual program listings. Little if any useful explanation is provided. Various programs are displayed, and then executed. This lesson seems totally inappropriate as a fourth lesson in the tutorial series.

Some lessons are inane at best. For example, AIL16, "The Cheshire Cat," loads two shapes from the diskette, Alice and the face of the Cheshire cat; and they exchange a few lines of dialogue, displayed at the bottom of the screen, while the faces remain mute and frozen. There is no attempt at animation. End of message.

In addition, there is a file called "Instance Alice," which allows the creation of procedures using a simplified entry list of commands. There is a similar utility on the Terrapin diskette; however, this version is more versatile (it possesses twenty-nine commands), and is probably best used as the first exposure to LOGO for a complete novice in programming.

Krell also provides twelve unique, pre-defined procedures of varying usefulness. Further, there is a workspace called "Instant Logo Tutor" which gives a somewhat incomplete listing of the commands available in LOGO, and which can be co-resident in memory with any work in progress. Finally, Krell provides twenty-four additional shapes to replace the "turtle" in any program. This is a nice touch, and can be very useful in distinguishing workspaces.

Krell includes a wall-chart of commands and procedure listings. It makes an attractive piece of room decoration, but it would be decidedly more practical if it had been prepared as a small reference booklet. It is the most well-written part of the package (Krell and Terrapin combined), and I recommend that it be cut up and made into a small reference booklet. Another, much smaller, chart is also provided. It lists the "Simple Logo Commands." This is of much poorer quality, and even has two inked-in error corrections.

APPLE LOGO

The version of LOGO distributed by the Apple Computer Company, Inc., was written for them by Logo Computer Systems, Inc. It uses essentially the same processes and structure, procedures, interaction, lists manipulations, and so forth. However, there are

decided differences between it and the other two packages.

I would recommend against purchasing both the M.I.T. and Apple versions. They have many things in common, but they *do not* use the same command names and abbreviations (or meanings), the same editing keys, the same procedure-definition process, the same syntax, the same nondestructive cursor, and the list goes on. A conflict arises in using both versions, which should be avoided.

So how do they compare? There are several primitive commands not implemented on the *Apple Logo* that deal with diskette access, and these are greatly missed. The calling of machine language routines, the easy insertion of remarks into a defined procedure, and a graceful departure are all missing. *Apple Logo* does have more primitives already in storage when the huge file is booted (and consequently it takes longer to load). There are more controls on color backgrounds, etc. And there are "tricks" that can be played when preserving and/or hiding procedures in an active workspace.

LOGO, as a language, is a useful learning tool that should be employed by any teacher interested in stimulating the creative processes in a student. Implementing either the M.I.T. or the Apple version should serve this primary purpose, though I believe mixing the two should be avoided because of the confusion involved. The M.I.T. version, in my estimation, has a slight edge over Apple's offering; but this is a very close call.

MACROSOFT

Micro-Sparc, Inc.
$49.95 alone; $99.95 with *The Assembler*
48K; Apple II/II+/IIe/IIc; *The Assembler*

Overall Rating	B	A	*Reliability*
Ease of Use	A	C	*Error Handling*
Documentation	C	C	*Value for Money*

MacroSoft provides you with a pseudo-BASIC language that allows you to write statements that look rather like BASIC. Micro-Sparc's Assembler then processes the statements into machine code, which results in smaller, faster programs than those in interpreted or even compiled BASIC. You must have *The Assembler* to use *MacroSoft*, which is technically just a macro library for that program. Operationally, it is rather more. Without knowing macros, you can code what looks like an odd BASIC program, run it through *The Assembler*, and wind up with a fast, compact program. You don't even need to know what an Assembler is.

Because *MacroSoft* statements only resemble BASIC, you cannot directly convert your Integer or Applesoft programs. You must rewrite them. Moreover, some things just aren't convertible, such as arrays of floating-point numbers or arrays of more than 127 elements or more than one dimension. Little error checking takes place and the program allows only one arithmetic operation per statement. It supports character strings as arrays of integers. In For...Next loops, it allows no Step specification, although you can alter it explicitly yourself, and supports only ascending sequence, not auto-decrement of the loop index. With all these limitations, it's fortunate that *MacroSoft* has some extensions of BASIC. It provides IF...THEN...ELSE, Repeat, While, and On constructs, and allows you to write Assembly language statements within the program.

You use *The Assembler*'s editor to enter *MacroSoft* programs. The seventy-nine page manual describes the language adequately and contains enough examples to help you learn the program, but doesn't have an adequate index. The copyable program disk requires Applesoft in ROM or in the language card if you want to use floating-point numbers or graphics operations. It provides sample programs in two languages, MacroSoft and Applesoft, which show dramatically just how fast *MacroSoft* can be. The samples also provide additional examples of coding.

If you don't need the BASIC features that *MacroSoft* doesn't support, you'll find it a good language—fast, compact, and vastly less tedious than Assembly.

PROGRAMMERS' POWER TOOLS

CE Software
$59.95
48K; II+/IIe

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	B+	*Error Handling*
Documentation	B+	A	*Value for Money*

While examining the numerous features incorporated in this program's many sample programs, I suddenly remembered the agonizing hours I spent as a novice programmer, trying to devise searching, sorting, and garbage collecting techniques. At that time I resorted to various manuals and magazines, which cost me a considerable sum of money. Even with the techniques I learned from them, I had trouble incorporating everything I needed within one program because of conflicts or limitations in memory. Not only does *Pro-*

grammers' Power Tools II save time and money, it also improves the quality of your programs.

To begin with, *Programmers' Power Tools II* offers formatting features that mainframe data entry personnel would expect. Thanks to its clever and friendly design, data entry flows easily and operates smoothly. If you tried to write all the error handling and formatting for input in Applesoft, you'd waste a lot of precious memory. If you have ever written programs for other people, you know what a pain it is to "bomb proof" program input. *Programmers' Power Tools* saves you a coding because it checks for illegal characters.

In addition to its efficient data entry features, the program also contains Machine language searching and sorting routines for single-dimension arrays. Speed always enhances programs, and *Programmers' Power Tools* does a nice job of incorporating speed into programs by using simple commands and a few parameters.

I feel the biggest problem with Applesoft is its inefficient method of clearing garbage from its memory. However, with *Programmers' Power Tools* I can reduce the amount of garbage significantly. I encourage those who do extensive Applesoft programming to seriously consider this product as an alternative to extra coding. It's nice to know that you can buy a software product that saves time and makes programming in Applesoft easier.

Assemblers and Compilers

THE ASSEMBLER

Micro-Sparc, Inc.
$49.95
48K; Apple II/II+/IIe/IIc

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	A	*Value for Money*

This good macro assembler has some exceptional macro processing facilities for the price. An assembler macro consists of a series of other assembler statements (machine instructions, assembler directives, pseudo-operations) given a single name. The computer uses that name like any ordinary built-in machine operation. For example, you could define a sequence of four instructions for moving a two-byte value from one place in memory to another as a macro called MOVE (or anything you choose). After you finish the definition, you can write the MOVE macro (one line) in each place that would otherwise require the original four. When the assembly takes place, the assembler replaces the one line with four. Since macros can make use of one another, the labor-saving effect mushrooms. If you often move several values together, you might combine them into another macro, such as taking a dozen MOVE macros and combining them into one macro called MOVES. Using MOVES would have the same effect as using forty-eight handwritten lines. The result: a more easily read, easily written, and error free program (think of the reduction in typos alone). The source code will take up less physical space, saving time and disk space as well. A conditional assembly facility, usable within macros, allows you to test the values of symbols and then uses the results of the test to govern whether to use one or more statements, or another group of statements. *The Assembler* also provides local labels and redefinable symbols—handy, but not ordinarily of critical importance.

The Assembler uses ten built-in pseudo-ops, a rather limited set but easily expandable through the macro facility. One of the libraries of macros provided translates from the pseudo-ops used by some other assemblers, allowing you to use the listings of programs written for other assemblers, often without alteration. Another library lets you use the *Sweet-16* instructions, which let you emulate a 16-bit processor. A third allows generation of Assembly code for the 8080 CPU.

You can direct the object code produced by *The Assembler* to disk or to memory for testing. You can easily control the speed at which the source code displays during assembly. The program comes on an unprotected disk. When you begin, it asks about your machine and peripherals to configure itself for convenient use. Once configured, *The Assembler* begins with a menu giving you the choice of assembling, changing various options, editing your programs, loading and saving programs, manipulating text files, and so on. The editor provided, although just a line editor, is flexible and efficient. The manual contains numerous examples, but the sparse index makes it impossible for you to find the one you need.

Because of its reasonable speed and flexibility, I consider *The Assembler* one of the best assemblers available for beginners through advanced Assembly language programmers. It is a good buy.

EDIT 6502/GNOME

LJK Enterprises
$99.95
Apple II/II+/IIe/IIc

Overall Rating	B-	C+	*Reliability*
Ease of Use	B-	C+	*Error Handling*
Documentation	D	C+	*Value for Money*

Edit 6502/Gnome is a co-resident assembler-editor suited to beginning Assembly language programmers. Because the package includes a comprehensive monitor along with its own DOS, it is also advantageous to Apple II+ owners who lack the Step and Trace features in the Integer Monitor ROM. Having its own DOS is understandable, since *Edit 6502/Gnome* uses a modified protected DOS yet writes source and object files to

unprotected disks. Source files can either be text files or binary-like "S" files. It isn't quite standard, but it suffices.

Edit 6502/Gnome has an adequate assembler. Besides handling the usual 6502 op codes, it supports arithmetic expressions with no logical operators, and no local labels. Conditional assembly is included, but macros are not. There are twenty pseudo op codes provided. Linked files are allowed using the LNK pseudo-op. Although ORG and OBJ can be specified separately, they default to $800. It is possible to assemble elsewhere in memory using the OBJ command, but the memory map doesn't clearly show where everything resides, particularly when more user space becomes available with the language card. However, the user can adjust the locations of the source, object code, and symbol table with Himem/Lomem type commands.

Edit 6502/Gnome has a good line oriented editor. Numerous control character commands allow insertion and deletion of characters, can quickly reach the beginning or end of a line, and search for a character. It also supports lowercase during input. Other editing commands allow string searches and global replacements. Lines can be added, deleted, and copied.

The system monitor and dissassembler are quite extensive. They include all of the Apple Monitor routines and then some. There are the usual commands: step and trace, change registers or memory, and memory moves. There is also a disassembler, a string search in Hex or ASCII, and a valuable Hex/ASCII memory dump. In addition, Monitor commands read or write a sector. The relocater command may be useful for relocating code. Unfortunately, the instructions aren't very clear.

Speaking of documentation, I find the entire forty-four page manual rather poorly written. Here is a package that could be perfect for the novice programmer in Assembly language. Instead of showing examples of how to use the assembler, the author uses valuable space to explain his philosphy in programming. I'll agree that everything is concisely documented, but it is hard to find and hard to follow. The reference card is very amateurish.

The Reset procedure for reentering *Edit 6502/Gnome* is undocumented. Perhaps they believe that their monitor, and not the Apple's, should remain in control. While this is a good philosphy, object files don't often run properly, and you must hit Reset to exit. Hitting Reset without an Autostart ROM in an integer machine while in this program is tantamount to starting over. The re-hook pointers should also be documented.

Edit 6502/Gnome is an adequate assembler-editor. It is relatively fast and easy to use. It is good for a beginning-to-intermediate programmer who is writing short Assembly language programs, lacks a monitor, yet does not need the complexity of an advanced macro assembler.

LISA, Version 2.6

Lazerware
$79.95
64K; Apple II/II+/IIe/IIc

Overall Rating	B	A-	*Reliability*
Ease of Use	B-	B+	*Error Handling*
Documentation	C	B	*Value for Money*

Lazer's Interactive Symbolic Assembler (*LISA*) Version 2.6 by Randall Hyde is an easily used co-resident assembler, one of the best choices for beginning Assembly language programmers. With the editor, assembler, and debugging package simultaneously in memory, programmers can immediately assemble their source code, test the program, and fix errors if necessary (particularly in short programs), without leaving the environment of the assembler or needing to swap disk files. While many competing products also offer co-residency, only this assembler checks syntax on input. In addition, it's lightning fast (Randy claims 20,000 lines per minute) and comes with an extensive 240-page manual (a tutorial for beginners).

LISA has a hybrid line editor. You edit all source lines on an individual line basis, inserting and deleting characters. The screen editing capabilities allow you to copy characters from other lines into the current line and skip over other characters on the screen. Although the editor supplies all of the essential features necessary for creating and maintaining source files on the disk, the editor lacks generalized search and replace abilities. However, you can obtain an optional editor on a utilities disk for an additional $29.95. Since *LISA* allows you to read and write standard DOS text files, you can edit your files with a word processing program.

In addition to the interactive input syntax checking described above, the editor tokenizes the text as it enters the system (much as BASIC does). This approach compresses the source file so that *LISA* can store roughly 2,500 source lines in its default setting of 26K of source storage space in a 48K machine. This exceeds the amount that other assemblers make available by about one thousand lines, despite their slightly larger text buffers.

The powerful *LISA* assembler supports *Sweet-16* operation codes, extended branch mnemonics, a wide variety of pseudo-operation codes, and even a special version for users of the R65C02 and 65C02 extended instruction set processors. While it lacks macro capabil-

ities, it does offer conditional assembly. The program's powerful local labels make quick branch and loop definitions easy. A label redefinition pseudo-operation even allows you to reuse labels and set up temporary variables. String definition psuedo-operations allows provisions for almost any kind of string, from simple ASCII strings with the high order bit on or off, to inverse and flashing. The default mode is decimal; naturally, it sports binary and hexadecimal data structures. The assembler produces a symbol table and has excellent error messages.

A series of pseudo-operations control memory management. You can easily chain source files for longer program listings. By default, the program stores files in 4K chunks. While you can increase this, to do so you must decrease the size of the text buffer. You can save each of these blocks of object code with a DCM pseudo-operation statement in your source code. However, you can ignore this limitation if you don't mind overwriting part of your source file during the third pass (*LISA* is a three pass assembler) during assembly. The program has no memory protect feature, so remember to save your long source listings before assembly.

In addition to the assembler and editor modules, the package also includes an upgraded version of the Apple monitor debugging program. The *LISA* monitor displays hex and ASCII characters, lets you enter hex and ASCII characters, has a hex to decimal converter, and has important step and trace features.

The package also includes several utility programs on the disk, such as DISASM/65, a powerful disassembler program; ANIX, a tiny UNIX for the Apple; several Hi-Res graphics utilities in source code format; and a symbol sort utility that produces sorted symbol tables.

The 240-page spiral bound instruction manual is probably the best tutorial included with any assembler. I found it well organized and easy to read, with each section labeled for beginning, intermediate, and advanced users. This helps beginners avoid sections that they might find confusing. Although Randy has a rather dry style, he also wrote a decent Assembly Language book called *How to Program the Apple II Using 6502 Assembly Language*.

On the whole, I judge *LISA* an excellent choice for beginners and advanced programmers alike. While its editor lacks some important features, beginners will find that the syntax checking makes up for the deficiencies. Advanced programmers will find that its speed, ease of use, advanced assembler features, and improved debugging facilities make it a serious development tool.

MERLIN

Roger Wagner Publishing, Inc.
$64.95
64K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A	A	*Value for Money*

Merlin is a co-resident editor/macro assembler; it is upward compatible with its predecessor, *TED II+*. "Co-resident" means that both the editor and the assembler are simultaneously located in memory. This is a very attractive feature when trying to debug an assembly language source listing. You don't have to reload the source file from disk before re-assembling. Convenience is its major advantage, but it does limit the size of the source code. *Merlin* uses the extra memory on the language card to store itself, DOS, and your symbol table and object code. This allows source files to reach 30K, or about 1,500 lines of commented source code.

Merlin closely resembles the Apple Tool Kit's assembler/editor in its functions. This is no mere coincidence, since this series of assemblers began with a crude version developed by Randy Wiggington of Apple Computer, Inc. It underwent several rewrites by Call Apple members, evolving into *TED II+*, and was converted from Integer BASIC to machine code by Glen Brendon. He did his best to achieve compatibility with its predecessor as well as the Tool Kit, while incorporating macros and conditional assembly.

The editor is probably the best line-oriented editor for the Apple. Every imaginable command is provided, combined with a very flexible syntax structure. A relative line numbering scheme is used; editing command operands may be a line number, a list of line numbers, and/or a range of line numbers. Commands are provided to list, add, insert, delete, change, or copy lines. The change command can be either local or global, and it will optionally prompt you to verify each change as it is made. Tab stops may be set, using blanks or any other character as tabs, which allows nicely formatted listings and assemblies. The best feature of the editor, however, is the Edit command, which prompts you with one or more lines, allowing you through the use of Control keys to add, insert, or change text very easily. The command modes are exactly the same as those in the *Program Line Editor*, making it probably the best implementation of a local editor available.

The file interface module allows the use of most disk commands, with the exception of Exec. Binary files are used for speed. They are not compatible for use with *PIE* and other editors. However, *Merlin* will read any Apple text files, including those from other assemblers

such as Apple Tool Kit. Files can then be made compatible using its advanced editing features. All source files are saved to disk with an ".s" tacked on. Object files are saved under the assigned name.

The assembler is quite complete. In addition to standard 6502 mnemonics, Sweet 16 and extended branch opcodes are also supported. Zero-page addressing is handled more or less automatically, and there are several immediate operand types (high, low, ASCII, hex, decimal), with the decimal format being the default mode. Pseudo-opcodes include most of the standard types, plus some included for reserving space, control printing of the assembly listings, and several used for generating data constants and ASCII strings. Good support is provided for arithmetic and logical expressions. Divide and multiply operations have been reinstated in this version. Macros with conditional assembly (DO, ELSE, and FIN) have also been incorporated. Error messages are clear, and the listings can be halted or aborted at will. Symbol tables are listed both alphabetically and numerically unless the listing option is off. Chained assemblies are also supported. The Put pseudo-opcode allows parts of a source file too large to fit in memory all at one time to be assembled. Since the allotted space for the symbol table and the object code is slightly more than 6K, portions of large object code files must be saved to disk (using the Sav pseudo-op). The ability to save portions of a program is useful in cases where there is more than one ORG. Incidentally, ORG and OBJ are independent of one another, a very thoughtful feature.

This assembler also comes with an interactive disassembler called the "Sourceror." It can disassemble Sweet 16 code as well as 6502 code. The interactive portion of the disassembly allows you to interpret sections of code either as hex data, ASCII strings, or as two-byte words. Once the code is properly disassembled, the source code is loaded into *Merlin* to be interpreted and read. It is the best disassembler on the market to date.

MERLIN PRO

Roger Wagner Publishing
$69.95
128K; IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A-	A	*Value for Money*

Merlin Pro is probably the definitive assembler for the Apple IIe and Apple IIc computers. It takes complete advantage of the computer's 128K memory, works with either ProDOS or DOS 3.3, has either 40- or 80-column capability, can assemble 6502, 65C02 and 65802 source code, and has a Linker for relocatable code modules for very large object code files. Like its cousin *Merlin* (reviewed above), it is a co-resident assembler and has the best line-oriented editor (40 editing commands) of all the Apple assemblers. It also has outstanding flexibility with over 50 pseudo opcodes. Many of the new ones like REL, ENT, and EXT are for use by the Linker, and others like TYP are for use with ProDOS only.

Merlin Pro resides in auxiliary memory along with its monitor. It assembles object code and keeps the symbol table here also. The space from $900 to $9853 just below DOS is set aside for very large source files. Actually, not all of this space is available if you have a library of Macros. Nevertheless, it is an effective use of space, although one might have attempted to take advantage of the empty space where Integer is normally located.

When object code is tested it is transferred from its default address at $8000 in auxiliary memory to main memory with the "GET $8000" command. There is also a command called SWAP that will hide your source code in auxiliary memory while you test a program.

Merlin has a number of pseudo-op formatting commands that are worth noting. In addition to having listing control with the ability to see or not see the generated macro code, the CYC pseudo-op can calculate and print cycle times for the code. It even takes into consideration possible added cycles depending on certain conditions the assembler cannot forsee, like whether a branch is taken. It uses a single quote to indicate a possible extra cycle.

The Linker is a very powerful feature. Usually it is used to relocate source files, but it allows an extremely large program to be assembled in one operation (over 41000 bytes long) much quicker than using a long series of PUT files (included source files). You don't have to worry about duplicating labels that are used globally in your program. With a REL file only labels defined as ENTry in the REL (and EXTernal in the current file) would be shared by both programs. This enables different programmers to work on independent sections of a large program, then quickly put the whole package together without worrying about conflicts.

Merlin Pro comes with powerful disassembler, the complete, commented, disassembled source listing of Applesoft BASIC, and a clearly written 164-page user manual. While it isn't exactly written for beginners, there are several short examples where the beginner is walked through the editing and assembling process. The program is unprotected and copyable. In sum, *Merlin Pro* is an outstanding tool for the advanced or

professional programmer. It has no equal for versatility, ease of use, and speed.

S-C MACRO ASSEMBLER

S-C Software
$80.00 (Version 1.0); $100.00 (Version 2.0)
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B+	A	*Value for Money*

The people at S-C Software have upgraded their very fine *S-C Assembler II* into a professional package by adding both macro capabilities and conditional assembly, and by improving their editor. With the ability to support a 16K language card (if present), the *S-C Macro Assembler* becomes a powerful tool for beginners and advanced programmers alike.

This is a co-resident assembler/editor. Because everything resides in memory simultaneously, there is no tedious swapping of files when moving from the editor to the assembler and back again. This is perfect for beginning programmers, who are apt to make serious mistakes when writing their source file. Assembly in this two-pass assembler is quick, and the assembler now pauses when it encounters errors instead of aborting as it used to, a welcome change.

The assembler offers a very fine line-oriented editor. For those who prefer a screen-oriented editor, the Laumer Research Full Screen Editor is available (for either version) at extra cost. The commands for single line editing include character insert and delete, moving the cursor to the next tab stop, or moving the cursor to the beginning or end of the line. The editor has full string search, global replace, copy lines, delete features for a range of lines, and a line renumbering function. Version 2.0 has a move lines capability as well. I should mention that each line number has four digits (starting with 1,000). Version 2.0 allows line numbers from 0-65535. The regular assembler requires a Control-I to give you the next line number. The Macro assembler has an Auto mode as well, which gives you the line number after the Return key is pressed from the previous line. Of course, numbers can be overwritten, and you can give it any line number you wish. Text files can be 24K in length on a 48K machine, and 32K long using an additional language card. The .IN (Include) directive allows source files as large as your disk space, in either version. This will allow you 1,600 lines of commented source code.

The assembler is quite complete. It has macro and conditional assembly, supports Sweet 16 op codes, allows for local labels, and allows the chaining of files. Extended branch mnemonics are not offered. Version 2.0 includes the BGE and BLT aliases for BCS and BCC. ORG and OBJ are fortunately separated, as they should be. Both default to $800; but if you are careful, you can place them in a clear portion of memory between your text file and your symbol table. The symbol table starts at $1,000 in the non-language card version, and builds upward. The text file is stored just below DOS, and builds downward. Choosing an alternative ORG is important if you have a long Object file. The .TF (Target File) directive stores object code on disk in a Binary file, in either version. Listings are nicely formatted, and can be suppressed if speed is of importance. The symbol table is alphabetical. Thirty-two character labels are allowed, and local labels can be used for modular programs. There are a few non-standard formats, such as Immediate Format for obtaining the most significant byte of a two-byte expression. It uses a "/" label, rather than a "#/" label.

A very good monitor is included in the package. All commands are usable from inside the *S-C Macro Assembler* by typing a dollar sign and the monitor command. It can disassemble, display and change memory or registers, and move blocks of memory. A program can be executed beginning at a label or memory address using the MGO command. If you intentionally hit Reset while testing a program, you can reenter the assembler through a documented reentry point.

The documentation is very good. It is lengthy (approximately one hundred pages), complete, and comprehensible. It is meant for beginning programmers, and so supplies numerous examples. The only significant lack I noticed was this: while memory usage is clearly explained, it would have been helpful if it were also in map or chart form. Version 2.0 has a 20-page supplement to the manual, covering the new and modified features.

In sum, the *S-C Macro Assembler* is one of the best choices for both the beginning and advanced programmer. Its co-resident nature allows programs to be quickly edited, assembled, and tested, entirely within the framework of the program itself. Perhaps its ease of use is its most attractive feature. Also, it is not copy-protected, allowing transfer of *S-C Macro Assembler* to working disks or to hard disk systems.

Disk Utilities

A-STAT 83.1

Rosen Grandon Associates
$200.00
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	C+	C+	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	C	C+	*Value for Money*

A-Stat 83.1 evolved from the mainframe, time-sharing package *P-Stat 78*. It consists of two double-sided disks with Diversi-DOS to speed up disk input and output, plus a 110-page manual (140 pages according to advertising) subdivided into an introductory guide and a command language reference guide. *A-Stat* makes a number of procedural decisions that do not take the novice into account. For example, the manual instructs you to configure system disk one without giving you any specific advice to back up the disks. You should copy the four disk sides and put away the originals *before* configuring any of the disks.

The first portion of the manual introduces you to many of the program's features. Unfortunately, it often takes you through an operation step-by-step only to abort the procedure near the final step with instructions such as: "Enter N because this is make believe." Not only do you fail to complete procedures, the manual often does not contain the output expected from the completed procedures. Moreover, the disks hold no sample data files. The manual also lacks an index. Improving this situation would certainly benefit people relatively new to computers.

The current version of *A-Stat* contains a "preprocessor" that allows you to use menus in addition to the command language—a welcome addition for the novice. Once you've become familiar with the procedural commands you can bypass the menus. In fact, the menus prompt you through the building of commands and act as an on-line tutor. Generally, the final output of any menu sequence is the actual command statement. *P-Stat 78* users can go directly to the command level because *A-Stat* is virtually identical, which also helps prepare *A-Stat* users for the mainframe program *P-Stat 78*. Unfortunately, this deliberate similarity often leaves you with the feeling of working on a mainframe package.

A-Stat offers a number of powerful features. It stores data files as ASCII text files, can read files created by other software, can write files that other programs can read, and can read and write data interchange format (DIF) files. Specific features allow the program to interface with both *File Cabinet* and *Apple Plot*. At any point in the program you can move into and out of Apple DOS (to catalog a disk, for example) and back and forth between the command level and the menu mode. The program can transform variables and create new variables from existing ones. The transformation operations include addition, subtraction, division, multiplication, exponentiation, natural logarithms, sine, cosine, square root, and random numbers. Logical expressions include less than, less than or equal to, equal to, not equal to, greater than, and greater than or equal to, but they do *not* include "and" or "or." Entering a letter in any field where the program expects a number takes care of missing values. The impressive array of statistical procedures includes descriptive (mean, standard deviation, minimum, maximum, sum, skewness, and kurtosis), frequences (discrete or continuous data), cross tabulation (with chi-square and other statistical significance tests), Pearson product-moment correlation, one-way ANOVA (with t-tests), multiple regression, and factor analysis with Varimax rotation. *A-Stat* handles missing data effectively, provides graphs of histograms, and produces generally well formatted and easy to read output. Computations are fast. However, accuracy on complex data sets such as Longley's often decreases to a single significant digit.

A number of parameters limit the maximum file size. For starters: no more than 45 variables per file, no more than 255 characters or columns total width for all the file's variables combined. Although there is no restriction as such on the number of cases, other factors limit the total. For example, the Sort command handles only 1,200 cases. In addition, a data file plus its dictionary must take no more than a single disk. A file with 45 one-column variables could include no more than 2,608 cases because of disk space. Variables of larger width

proportionally reduce the maximum number of cases. The regression procedure handles 25 variables (more than sufficient in general) and the factor analysis procedure handles up to 30 variables (generally insufficient). I should point out, however, that many statistical procedures, especially those with large sample sizes and extensive variable lists, are better handled on a mainframe computer.

Overall, when compared to other Apple statistical packages, this ambitious product proved less than satisfying. The manual lacks an index, the disks are written on both sides (the Apple only reads one side of a disk), the program provides no sample data, the statistical data fails to equal that of other packages, and so on. Although useful, *A-Stat 83.1* just is not the best available, advertising hype notwithstanding.

BAG OF TRICKS

Quality Software
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

Written by the authors of the best-selling book *Beneath Apple DOS*, the companion package incorporates four machine language utility programs that go far beyond those included in the book. Although the programs occupy a level suitable for an experienced Apple user, the documentation provided contains good "hand-holding" tutorials to assist the novice in repairing his damaged disks.

A track dump/examine program ("Trax") appears first on the menu. Trax reads any track on a disk and displays the internal Apple disk formatting information while flagging exceptions to standard formats. It proves particularly useful in locating the specific cause of disk I/O errors, or for learning about disk formatting. It offers several display modes, and handles thirteen-and sixteen-sector formats as well as non-standard formats.

Init reformats one or more tracks on a disk while preserving any data remaining on them. It supports both thirteen- and sixteen-sector formats. Init proves particularly useful in repairing damaged sector formats on a catalog track or in a file.

Zap provides basic capabilities for reading, displaying, and updating disk sectors. Its features clearly exceed those of similar utilities on the market for Apple. It provides more than fifty commands with online Help displays to assist beginners. It offers full support for thirteen-and sixteen-sector formats, as well as Pascal and CP/M. You can reference locations either by track and sector number or, within a file, by relative record number and offset byte. You can define variables for holding disk address locations. A trace table (maintained by the system) lets you back up to sectors accessed previously. The screen displays a complete 256-byte sector in both hexadecimal and ASCII (with various translation modes available). The system provides sixteen internal buffers, with multiple Read/Write commands permitting easy movement of data from disk to disk. The novice need not fear the power offered by Zap because it has a write-protect feature that lets the beginner experiment without damaging his disk. The system also provides full printer support with an optional audit trail of updates on hard copy.

The final utility, Fixcat, automates the process of recovering a damaged catalog track. Not only does it retrieve lost sectors by updating the VTOC map and recover accidentally deleted files, it also scans the disk for all files which do not appear in the catalog. You can then interactively and conditionally create catalog entries for them. This final program justifies the price of the entire program for anyone who has lost a catalog on "that special disk."

I find it likely that *Bag of Tricks* will become the standard for disk utilities for some time to come. It seems almost inconceivable that any Apple II user would not find at least one of the four programs invaluable.

COPY CAT

Roger Wagner Publications, Inc.
$19.95
48K; II/II+/IIe/IIc

Overall Rating	C+	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B+	B+	*Value for Money*

"An All Purpose Copy and Catalog Editing Utility ..." it says on page one of the instruction manual. Sure, I'll agree with that, but there are some things that take a bit more explaining than a catch-all phrase can provide.

Copy Cat consists of fourteen interrelated units. You can copy, delete, compare, initialize, lock, and modify "Hello" program names, define drives, revise and view catalog entries, and unlock, verify, and zap the DOS. All of this is accomplished on the DOS 3.3 disks—not bad, huh? And on top of that, the programs are all unprotected and viewable, so you can also see just how they work. While you are working with your files, the

track and sector being accessed are displayed on the screen.

When you boot the program, you are presented with a menu of five choices: to run Copy-Cat, Copy-Quick, Copy-Cat Installer, Copy-Quick Installer, or to quit. The Installer options let you set defaults for which slot and drive hold the source and object disks. Once you've set them, whenever you boot up the program thereafter, your slot and drive options already set. A secondary option lets you switch defaults within the Copy-Cat program itself, something that can't be done from within the Copy-Quick section.

I have to admit that I am fond of utility and cataloging programs. I'm always interested in new seeing new ones. Since Roger Wagner is a well known utility vendor, I was extremely interested in this product. The marks I gave it imply that I found something wrong. For the most part, it's just too cluttered. Take the I(nitialize/DOS/mass copy) function, for example. When you press the I key, you see a menu of more choices:

1. Choose to initialize a disk,
2. Copy DOS from one disk to another,
3. Copy all data files from one disk to another, or
4. Do number 1 first then do 3.

A second really confusing area, especially for newcomers to computing, is the "Omni-Select Menu," which is a submenu of some of the other entries. Here, you are given further selections to choose from as to the type of file you're working with. You can pick A(pplesoft), B(inary), I(nteger), R(elocatable), S (type), T(ext), G(roup exclusive), M(y choice), or P(rompt me). Half of the people that I showed this to were somewhat lost when given so many options—all they wanted to do was copy a file. Throw in the wildcard option when copying files and many people just throw up their hands and go back to FID.

The flip side of my disk is a free "Soft Disk," a collection of interesting utilities, games, and other programs. The documentation doesn't cover it, but it is mentioned on the disk jacket. The programs are fun and educational, especially since they're free.

I almost feel bad about criticizing it, since *Copy Cat* does so much so well. You can't beat the price, the thoroughness of the documentation, or the program's power. Whatever you do, don't get lost in the maze of selections. If you can find your way through and get used to it, you have definitely found quite a bargain.

COPY II PLUS Version 5

Central Point Software
$39.95
64K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Copy programs have been around for as long as there has been a need to back up copy-protected software. Everyone has had a problem some time or another, either from media failure, accidentally erasing a file, initializing the wrong disk, or worst of all, spilling something on the disk itself. *Copy II Plus* tries to take care of all of these eventualities by providing for an easy method of backing up files and disks full of information or programs, as well as undeleting, arranging, locking, examining, and just about anything else you could think of to do to a disk.

This version is the first one put out by Central Point Software on a standard DOS 3.3 disk. This allows for easy backup and use so the original can be put away for safe keeping, and also allows for the errors that do occur regularly when using a utility like this—like forgetting to remove the *Copy II Plus* disk. Not that *I* have ever done that, you understand. Besides that, you have to admit that a product that allows you to back up other programs for archival purposes, but not itself, would be of questionable value.

When you first boot up the program disk, you are presented with the DOS utilities menu which offers a number of choices apart from the more sophisticated copying techniques. The options include:

- Copy disk, files, DOS, or to the protected copy section. If you have a IIc or a IIe with 128K, the copy disk option will copy the entire disk in two passes.
- Catalog a disk, normally with lengths, with hidden control characters, or with deleted files.
- Delete a file, DOS, or the whole disk.
- Lock a file or files, or unlock as easily.
- Rename files.
- Alphabetize all the files on disk. No other sorting or rearranging is available.
- Format a disk (3.3 only).
- Verify the disk, identical files, and drive speed.
- View both text and data files.
- Track/sector Map showing where all files are located.
- Sector editor (DOS 3.3, 3.2, patched, and custom).
- Fix file sizes (saving all unused space).
- Change Boot program. View the present "Hello" program or change it to something else.
- Restore deleted files.
- New drive information (including printer). Set for

either DOS 3.2 or DOS 3.3, including which drive to read/write to.

- Quit.

The other main option is on the "Copy" unit—moving to the Bit Copy Menu. You do the heavy, difficult copying here. The menu is a bit different with the main emphasis on copying a disk track by track versus working with files. Among your choices: Auto copy, in which all you need to do is enter the name of the program and the to/from drives; Partial Auto copy for specified tracks; Manual Bit copy where you change the parameters as necessary until the copy is successful; Manual Sector copy, a quick-copy program that will usually copy programs with simple protection schemes; Nibble editor for reading the bits on each track and changing parameters as necessary; Hi-Res disk scan. The Hi-Res Disk scan steps through the disk at either .25, .5, .75, or a track at a time, showing data marks and empty tracks. This extremely valuable aid to checking the condition of the disk and verifying the copy-protection scheme requires an experienced user to make the best of it.

The rest of this menu is given over to the entering, printing, and modifying of parameter listings. Although there are hundreds of combinations of parameters listed, there are over 10,000 programs for the Apple on the market, leaving many protected programs that require further parameter modification for successful copying. Why try to make all of the changes each time you back up you disk when entering the correct parameters once will do it automatically.

I can find nothing about *Copy II Plus* that I don't like. The manual is comprehensive with suggestions for program use and information about copy strategies. Updated parameter listings are available on a disk compatible with Auto Copy for $5. New versions are offered, when published, to all licensed users at half price. This version is much better and quicker than version 4.0; an Apple owner would have to be crazy not to avail himself of it. My only disappointment is that some of the user-supplied parameter listings are either faulty or outdated. Nonetheless, I'm already looking forward to the next version; I just can't imagine how Central Point can improve on this one.

DISK DRIVE ANALYZER

Verbatim
$39.95
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Disk Drive Analyzer checks out the operation of your disk drive. By running this program periodically, you can assure yourself that your drive works properly. It's simple to use and only takes a couple of minutes to run. The program checks four functions: Alignment, Speed, Clamping, and Write/Read. You can check these functions individually or all at one time. You can test either drive 1 or drive 2, but only in slot 6. If you have more drives, or your drives are in other than slot 6, you must move your controller card to slot 6 to use this program.

The Autotest Option will run all four tests and display the test results, after which you may switch the disk to your other drive. This test takes a very short time to run. If you elect to run the individual tests, you see a nice graphic display of what is happening internally. A Help screen associated with each test explains the functions that the individual tests check, and what it means if they fail.

All too often, we take our disk drives for granted as long as the system works. However, adjustments on disk drives do go haywire. Many times you don't discover the problem until it's too late and lose data or programs as a consequence. By taking a few minutes to run this program, you can avoid this danger.

DISK TOOL KIT

RAM PI Technologies
$300.00
48K; Apple II/IIe

Overall Rating	C	B	*Reliability*
Ease of Use	C-	C+	*Error Handling*
Documentation	D	D	*Value for Money*

Disk Tool Kit reads and analyzes a disk nibble by nibble in order to edit and/or duplicate copy-protected programs. The program's manual operation does not replace your favorite copy program, but helps you analyze and set parameters. When it encounters difficult copy-protected tracks, *Disk Tool Kit* can copy them following your orders. Take heed—unless you are an expert in the intricacies of DOS, or have read and

understood the book *Beneath Apple DOS*, the rest of this review may mean very little to you.

Disk Tool Kit comes with three utilities. The first, called Scan, nibble-reads data on a disk and allows you to analyze and save the results for copying. Its features include: display of hidden self-synchronization nibbles; measurement of relative synchronization between tracks; nibble-reading of full, half, or quarter tracks; searches of the computer memory for patterns; display of invalids; a list of the computer memory (hexadecimal or ASCII) with pointer control; a comparison of the computer memory and checksum; an evaluation of the distributions and validity of tracks and nibbles; and saving the analyzed computer memory for editing or copying.

The second utility, called Copy, allows you to edit or copy the computer memory to disk tracks. You can load or save edited computer memory and parameters to disk, compute track length requirements for nibble counting, and select algorithms and parameters to make dynamic changes and control the copy process. It even allows you to copy full, half, or quarter tracks with a special combination option for bit shift patterns and one or two framing bits. It also allows you to measure the absolute track nibble length and to control nibble counting.

The third utility, called Find, expands the nibble analysis and copying process to the bit level. You may: analyze either bit shift or normal nibble bit patterns; identify bit shift and one or two framing bits; identify the absence of a clock pulse jitter; nibble-read full, half, or quarter tracks; create special nibble bit patterns for copying; and save analyzed patterns in memory to disk.

The program has been enhanced with a special copy utility that will supply the software designer with a package that will reduce the development cost of producing state-of-the-art protected software. The rise in the cost of this program from last year reflects on the improvements of this update.

Obviously, this program targets the advanced computer specialist; it requires a thorough knowledge of the disk operating system. The manual consists of fifty-eight loose pages of technical jargon and formulas—difficult to work with or use as a reference guide. The program has no tutorial or introduction.

I think this program is overpriced compared to its competitors, many of which also provide automatic bit copying. Although its many utilities can supply an expert with valuable capabilities, I found that it took me at least an hour or more to identify basic protection schemes and move through the three utilities provided. At this rate, why not just get a backup copy or even buy another copy of the program? It certainly is cheaper.

DISKQUIK

Beagle Brothers Micro Software
$29.95
128K; IIe with extended 80-column board

Overall Rating	B	A	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	C+	A	*Value for Money*

Have you ever wanted quick access to files and programs but couldn't afford the price of a RAM disk emulator? Well, you sure can't beat the price on this one. While it doesn't afford you the capacity of a standard disk, you'll be surprised what you can store in that seldom used 64K of memory.

After loading this utility program into the extended memory card on the IIe, you can save and load programs for later recall with a minimum amount of time. As in all RAM storage, it's not permanent unless you store it to disk. This program can dump the total memory to disk or load it back into memory through a special disk dump routine. A special initiate program on the disk lets you save the memory dump in one complete block. Note, however, that once you have done so, you cannot use the disk for anything except *DiskQuik*. The catalog changes to track $03 instead of the normal $11, so you can't even catalog the disk under normal circumstances. An extremely handy file transferring program, FID, transfer files between the standard DOS 3.3 disk and the phantom drive (*DiskQuik*) that pretends it's located in slot 3. After you have loaded your files or programs to slot 3, you can dump them to the specially prepared disk for later recall. This may seem an odd way of doing things, but once you've loaded and saved your data to the specially formatted disk, your worries are over. It also speeds things up considerably. For example, when I loaded a program that uses sequential text files under normal DOS, it took two and a half seconds to retrieve an average record. After I put *DiskQuik* into memory, I transferred the same program to slot 3 and ran it again. The same screen was displayed in close to one second. On the average, retrieval increased in speed by close to 150%. You can imagine how much time you'd save during a normal day of use.

This utility also has provisions for programs that access the extended memory for "double Hi-Res." On the other hand, if another program utilizes the upper

64K of memory, you must re-load *DiskQuick*—the other program has erased it from memory. The manual also advises you that Pascal programs cannot access *DiskQuik* files, but they won't destroy information stored in memory, either.

The manual tries to make the information as easy to use as the program. Unfortunately, the sheer quantity of options available make it hard to understand which does what. An important point: You *must not* forget that you lose whatever is stored in high memory when you turn off the computer. You *must* save the information to disk or else suffer the pain of reentering it.

Overall, I thought the program ideal for those who work with a variety of unprotected programs, or data stored in text files. If you work with a limited number of programs or mostly play games, save your money and buy something else. On the other hand, if you spend a lot of time with your computer, you couldn't make a better choice.

DIVERSI-DOS

Diversified Software Research
$30.00
48K (required); 64K (recommended); II/II+/IIe/IIc;
16K language card recommended (II/II+)

Overall Rating	A	A-	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Diversi-DOS is an outstanding utility program with four different functions. First and foremost, *Diversi-DOS* is a highly modified DOS 3.3 operating system that speeds up disk access time by factors of three to five over normal DOS 3.3. In addition, *Diversi-DOS* can create an input text buffer and an output print buffer using a RAM card. Finally, the *Diversi-DOS* disk operating system can move itself into a RAM card to provide more program memory.

Diversi-DOS comes with complete documentation on the program disk. The utilities are extremely easy to use, and all features are accessed through one menu driven program. The *Diversi-DOS* disk operating system can be written onto any normal DOS 3.3 disk in about 3 seconds without disturbing any programs already on the disk. All disk access operations are then speeded up. Here are some comparisons of typical speeds between *Diversi-DOS* and DOS 3.3, respectively:

SAVE 5.9 versus 27.1 seconds (80 sector BASIC program)
BLOAD 2.6 versus 9.5 seconds (Hi-res screen)
READ 12.4 versus 42.2 seconds (52 sector text file)

The increased disk access speed has one disadvantage: the *Diversi-DOS* disk operating system must use the normal error message space of DOS 3.3 for other operations, and therefore only gives numbers as error statements. This seems a minor inconvenience compared to the speed gained.

The other utilities provided with *Diversi-DOS* work on any RAM card with 16K to 128K of memory. The print buffer utility can be configured to most printer cards.

DOS BOSS

Beagle Brothers Micro Software, Inc.
$24.00
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	A-	B-	*Value for Money*

DOS Boss permits you to customize the DOS on your disks by allowing you to change the DOS commands and error messages. The DOS command table has a maximum total length. If you shorten several of the commands, then you could lengthen other commands; for example, RUN to START. Likewise, you can change the error messages or stop someone from saving your program with a "NOT COPYABLE" message.

DOS Boss also allows you to customize your catalog. Catalogs can be listed by file type, in one or two column modes. The catalog type and volume numbers can also be customized to establish unreadable file types. In addition, the system allows you to format a menu through a program called *Key-Cat* which will allow you to run or execute a program with a single keystroke.

The documentation is exceptionally well written. The authors give many hints and advice for changing DOS without the use of their programs. Both beginners and experimenters will find this program useful.

D.R.S. (Disk Recovery System)

Sof/Sys, Inc.
$100.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	A	*Value for Money*

D.R.S. (Disk Recovery System) gives you an excellent chance of recovering your disk intact after you see the dreaded I/O error display. It uses its own RWTS (the routine that actually reads data from the disk), which enables it to read damaged sectors, disks recorded off-center, or disks with hub damage. It then creates a readable copy without altering the damaged disk.

D.R.S. is almost totally menu-driven. It offers three major options, the first of which configures the program by locating all controller cards, determining whether you have one or two drives attached to each card, testing the speed of each drive, and determining which drive most closely matches the speed at which the damaged disk was recorded. The second option, Phase I, automatically recovers the disk. It initializes a copy disk with the same volume number as the damaged one, then copies the disk one track at a time starting from track zero. It reads each sector and displays its progress on a track/sector grid map. If it failed to read certain sectors, the program tries different strategies in an attempt to re-read them. After trying all methods available, it writes the track to the copy disk and proceeds to the next track. Once the program has scanned all the tracks, you should have a perfectly working copy of the damaged disk. If the display indicates persistent bad sectors, you can repeat this step using different source and destination drives (which sometimes helps because of the differences in speed between different drives). In these further attempts to copy the damaged disk, only the damaged sectors are re-read. If the program still fails to copy the damaged sectors or if the catalog has been damaged, you can select Phase II. This option reconstructs DOS files and therefore won't work on Pascal or CP/M disks because they structure their files differently. The program inspects every file and examines the sectors allocated to each. If it encounters a sector unsuccessfully read before, it fills that sector with harmless information. It also checks deleted files. If they are intact, it undeletes them. In addition, it creates files for T/S lists unaccounted for in the catalog. Each file as recovered receives a grade value. If they contain errors, the grade value (B to F) is prefixed to the file name. *D.R.S.* writes this new catalog to the disk. It's done all it can to recover your disk intact.

The fifteen-page manual explains the operation of the program and tells you what each symbol means during sector recovery. It also explains the methods used during recovery. The appendix describes what the letter grades mean on reconstructed files. The documentation also includes a detailed explanation on recovering a physically damaged disk.

I found two possible problem areas. Since some disk switching takes place, you must be careful not to destroy your original disk by putting it in the wrong drive. The second problem is that the program won't work on copy-protected disks. It is itself copy-protected.

D.R.S. is capable of recovering damaged disks that regular disk editor programs could not. Even if the program can't totally recover your files, it will reconstruct what it can and grade the files according to the success of the recovery. In addition, although it only reconstructs DOS files, it will copy DOS, Pascal, and CP/M formatted disks.

THE FILER

Central Point Software
$19.95
48K; II/II+/IIe/IIc; DOS 3.3

Overall Rating	A	A-	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	A	*Value for Money*

This unprotected utility disk contains four useful programs for file handling and disk testing. The first, called The Filer, lets you manipulate files. It includes all FID functions with wildcard options. It allows you to copy the entire disk and view and modify the boot program to any BASIC, text, or binary file on the subject disk.

Fast Copy is a truly fast and reliable copy program for thirty-five, forty, or seventy tracks. It makes a copy of thirty-five Apple-compatible tracks (the entire disk) in thirty-eight seconds without erasing DOS in memory (thirty-three seconds if DOS is erased). The program displays error codes for each track (0 = no error, etc). You can also specify a selected range of tracks if you don't need to copy the entire disk, such as tracks 00 to 02 to copy only DOS. If you normally copy many disks, this program will give you much more time for other things.

The most valuable program on the disk, Disk Speed, measures the speed that the disk drive rotates in milliseconds and gives you the correct speed (198.00ms to 202.00ms), plus your disk drive's reading in a format more readable than that of other software available for

this purpose. The diagrams and instructions in the manual tell you clearly how to adjust your drive's speed to the correct reading, saving you costly trips to the computer store. This program alone is worth the price. It supports drives made by Apple (Disk II), Fourth Dimension, Franklin, and Micro-Sci (A2, A40, A70).

Disk Test performs a bad-sector scan, read/write test, and write protect test. The display gives you the current values for the number of tracks (thirty-five, forty, seventy), slot, drive, track (in hex), sector (hex), and total number of sectors read. If by some chance an error occurs, the program informs you of the type and track/sector where it occurred. This program is particularly useful in finding the specific track and sector where read and write errors occur, so you can repair them later.

Overall, *The Filer* is a reliable, useful, and friendly program. The accompanying documentation, although concise (six pages, both sides), left me with no unanswered questions. This group of programs is certainly worth the price.

THE INSPECTOR

Alpha Logic Business Systems
$59.95
48K; II/II+/IIe; language card

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

This is one of the better disk access programs available for the Apple. Disk data can be read in, changed, or corrected, then written back out to disk. This will even work with disks containing non-standard DOS if the monitor mode can be accessed in order to activate *The Inspector*. You can select any of the 256 memory address pages ($00 to $FF) for viewing using the buffer command, and display them in either a hex or ASCII mode. Any of the 256 bytes of data in each page can then be edited one at a time, or as a consecutive group of data.

Some of the 22 commands available allow you to configure the Slot, Drive, DOS version (3.2 or 3.3), and track/sector pair for the disk to be read. As a safety feature *The Inspector* will not read in any data if the buffer is set at $00. This section of memory is vital to the operation of the Apple, and reading in a sector at this position could halt the computer. Another safety feature won't let you write to disk unless you type Control-W. This is important, because there are several command keys in close proximity to it. The increment command will allow you to read or write consecutive sectors into consecutive buffers with a simple Control-I. This can be useful for transferring DOS or Hi-Res pictures. A map can be displayed of the VTOC, showing used (#) and unused (-) sectors, or a Hi-Res representation of a track's nibble data.

The Inspector can repair blown disks and recover or salvage data files. Catalogs can be fixed or altered, control characters in file names eliminated, or deleted programs recovered. DOS can be altered, and an example is provided for modifying DOS to avoid reloading the language card each time a disk is booted. A specific string of data can be searched for either incore memory or on disk, and BASIC programs can be edited in memory to enter normally illegal commands and line numbers, or even to create duplicate line numbers.

The 32-page booklet details installing *The Inspector* EPROM in the D8 socket for the Apple II+. The booklet also offers tips on how to use foreign DOS, along with tips on how to read half tracks using the nibble command. The package includes a machine language program which enables you to get a printout of the track/sector or nibble dump data using the Control-Z command; this will run a user routine located at hex address $300. It also comes with a postcard sized chart with all 22 commands on one side, and directions on how to access *The Inspector* on the flip side.

To use this program effectively you should be familiar with disk formatting. Though the documentation is good, it only begins to cover the necessary information. Further reading of the Apple DOS manual would be advised for the novice. You should also use *The Inspector* on a copy disk; never work on the original.

LAZARUS III

On Three Magazine
$49.95
256K; Apple III

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Have you ever removed a file by mistake and wanted to recover it? Have you ever mistakenly erased a directory from Pascal? If you answered yes to either question or want to protect yourself from this disaster, *Lazarus III* is what you need. *Lazarus* gets back your data with little effort on your part as long as the data remains on disk.

The author, Bob Consorti (editor and publisher of *On Three* magazine), has written a large program so easy to use that I have seen nothing to rival it. You can get on-line help at any point in the program with only two keystrokes. In addition, the User's Guide appears as one of the Main Menu selections. *Lazarus* searches any SOS directory or subdirectory on any volume for which you have an active driver. It displays the names of all files in the directory whether they have been deleted or not, allowing you to pick the file you want to restore and rename it if necessary. If you need to restore a number of files in a given directory, *Lazarus* allows you to change the Prefix so that you need only type in the local file names. The program always displays a default answer to a prompt. If you don't want the default, you can either replace it or modify it with the editing keys. You need not even memorize the editing keys, because Control-? calls up the information on how to edit at any time.

Although *Lazarus III* is currently available only by mail from *On Three* magazine, turnaround time is excellent because they use First Class mail.

LEXICOM 3.0

Micro-Sparc, Inc.
$49.95
48K; Apple II/II+/IIe

Overall Rating	C	B	*Reliability*
Ease of Use	C-	B+	*Error Handling*
Documentation	B-	C-	*Value for Money*

If you have invested time and effort in *Applewriter I* or *Muse* software, you may find *Lexicom 3.0* indispensable. If you haven't, you should consider your conversion needs and program capabilities carefully before buying this file conversion utility.

Lexicom contains thirteen file conversion options, only four of which you are likely to use if you don't own either *Applewriter I* or *Muse*. These four options convert: Applesoft BASIC programs to text (useful if your word processing program can't read BASIC program files); random access files to sequential text (useful if your database software doesn't have a similar utility); and DOS 3.3 files to DOS 3.2 files (a "Demuffin" utility of dubious value); and CP/M text files to DOS 3.3 text files (easily obtainable public domain software). The remaining text file conversion options convert: *Applewriter I* files to Supertext (*Muse*); *Applewriter I* to text; text to *Applewriter I*; text to Supertext; Supertext to text; and Supertext to *Applewriter I*. The other conversion options convert: *Muse's* Data Plot to Apple DOS picture files; *Muse's* Address Book to sequential text; and *Muse's* Address Book to split files (when the number of records exceeds disk capacity).

I found *Lexicom* easy to learn. On booting the disk, I encountered a self-explanatory options menu. I tried each of the text conversions just described and the Applesoft BASIC to text conversion. In each case, the program prompted me step-by-step to a successful result with little reference to the manual. I encountered only one minor difficulty: the prompting sequence isn't consistent among options.

Unfortunately, *Lexicom's* disk swapping requirements make it hard to use. I could convert only one file at a time, not an entire disk. Each time, I had to enter a prompting sequence, remove the program disk, insert my data disk, hit Return, remove my data disk, reinsert the program disk, and reboot the program. Worse, I had to remove the program disk, insert my data disk, press Return, and reinsert the program disk to display file names because the program can't display file names on a second drive. A better design would have eliminated most of the tedious disk swapping by allowing all files on a disk to be converted and by having the entire program reside in memory.

The manual is well written but disappointingly incomplete. It outlines potential uses, explains each menu option, and tells you everything you need to know to run the program. However, I feel a program marketed as a file conversion program for the Apple should include more. It lacks an overview of the file incompatibility issue, such as the sources of incompatibility and a perspective on the lack of standards in the software industry. We wouldn't need a program like this if word processing software offered a way to create standard ASCII files written in Apple DOS format. The moral: don't buy word processing programs that don't adhere to these standards.

In summary, *Lexicom* works—but tediously. It's certainly better than rekeying files. I'm just disappointed because we need a general word processing file converter for the Apple, yet *Lexicom* addresses the needs of only a few; others must wait.

LIFESAVER

Micro Lab
$25.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	A	*Value for Money*

Lifesaver tells you what to do when the kids have played frisbee with your disks. The program can address any RWTS (Read or Write Track and Sector). This includes DOS 3.3, DOS 3.2, FORTRAN, Pilot, Pascal, CP/M, or Apple III files. The entire system is completely automatic. It begins with a blank disk to check the speed and condition of your drives. It then checks to see that your precious (but damaged disk) has a write-protect tape on it. It then checks each sector of each track to test the condition of the data on the disk. As soon as *Lifesaver* encounters a bad sector, it carries out a four minute check routine to see which of a number of different methods will read the most data from that track. The screen displays a track sector matrix that grades the quality of the data found in each sector. Frequently you'll see the grade improve as the program applies different repair techniques to the bad sector. When it has wrung as much information as possible from that track, it copies the track to the new disk in drive B and goes on to the next track. It doesn't take a mathematics expert to figure out that a particularly bad disk with a damaged sector on each of its thirty-five tracks could take up to two hours of automatic disk access to wring the most data, nibble by nibble, from the damaged disk. By comparison, copying a completely undamaged disk takes only two minutes.

After carrying out this procedure, *Lifesaver* rebuilds each file to whatever extent is possible, placing dummy information in damaged sectors to make them readable. When finished, it supplies you with a catalog of graded files on the new disk according to the reliability of their data.

This is an excellent program for people who use commercial programs. It requires virtually no familiarity with DOS and does everything automatically. While it won't copy protected programs, it will rescue data created using them.

LOCKSMITH 5.0

Alpha Logic Business Systems
$99.95
48K; II+/IIe

Overall Rating	A-	A-	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

Locksmith 5.0 is the latest version of the company's controversial copy program. Having evolved over the last few years in response to newer and more sophisticated copy protection schemes, this version is reportably sophisticated enough to copy everything. Essentially, it enables you to make backup copies of your most valuable software—something many manufacturers are reluctant to do at a reasonable price.

Of course, any program versatile enough to duplicate any disk is bound to be used for the illegal copying of copyrighted software. At stake are the profits of software houses lost through piracy. On the other hand, software buyers want uninterrupted use of the purchased program in the advent of disk failure. Each has a strong case. Frankly, the most pirated software making the rounds through user's groups has been deprotected anyway, so that slow nibble copy programs such as *Locksmith 5.0* are rarely necessary. I wouldn't be surprised if *Locksmith 5.0* was being used mainly to back up legitimate purchased copies. Incidentally, earlier versions, but not this one, embedded a traceable serial number on every copied disk. While it was intended to track software pirates, no software houses ever took advantage of the program's telltale trail.

Although *Locksmith 5.0* includes a number of disk utilities and a fast copy program for unprotected disks, the heart of the package is the Nibble Copy Program. Extensive algorithms controlled through a new programming language called LPL analyze the disk to be copied and implement procedures necessary to copy each disk. Earlier versions required users to input various parameters for each program. The new language allows the user to write custom-tailored backup/copy procedures for programs difficult to copy using only the standard *Locksmith 5.0* defaults. The language enables the user to invoke nearly sixty-four algorithms by name to perform various analysis and copy functions. In addition there is provision for error handling and looping. The LPL commands are entered as a normal text file with the supplied text editor. Actually, most of the parameters or LPL commands for nearly two hundred Apple programs are included in several large text files on the disk. These are also listed in the seventy-two-page newsletter that comes with the instruction book and two copies of the protected program. If your favorite program isn't listed, you can call their

customer support number during normal business hours.

Locksmith 5.0 can copy programs protected with any of the following methods: address field header changes, pseudo sectors whose length can be an entire track, synchronized tracks, nibble counting, half tracking, non-standard self-sync nibbles, spiral tracks, and even—believe it or not—the latest quarter track spacing! I can't say that I've tested *Locksmith 5.0* on every one of the most sophisticated protected disks, but the scuttlebutt among users is that the program generally works and is among the best, even if it is a mite slow.

The program includes a number of useful utilities such as a disk speed test and a disk certify test. With the former you can choose between coarse, medium, and fine speed resolution on the resulting graph. Note that this test ruins the data on Track 0. A disk certify test attempts to write and read data on each disk track. This is very useful for finding damaged and unreliable tracks. The last utility is a nibble editor useful for repairing damaged data on a disk. However, only advanced users will find it useful because it treats data in nibbles rather than in the customary format of 256-byte sectors.

Locksmith 5.0's Fast Copy Program is excellent. While it can only copy unprotected normal disks, it is fast and will take advantage of any extra RAM on 16K or 128K cards. You can choose to verify data or not. Even in the slow verify mode, it only takes twenty-six seconds using two drives, and less than twenty seconds if you own a 128K RAM board. A graph displays the status of each disk sector on every track. You can even tell if the copy procedure required one or more passes on either the read or write on any sector. Bad sectors are indicated by asterisks and usually mean a damaged disk. Sometimes merely reseating the disks can clear up the problem.

Locksmith 5.0 is a useful utility package. The value to prospective buyers is mainly determined by how much they value the programs or data stored in their collection. The fate of user-supporting software vendors is anything but certain in today's volatile market, and a means to permanently back up copy-protected software may be the user's only alternative.

MULTI-DISK CATALOG III

Sensible Software
$25.00
48K; Apple II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B+	*Value for Money*

Multi-Disk Catalog III is a master catalog utility program designed to run on DOS 3.2, 3.2.1 or 3.3. It is capable of cataloging one's entire disk collection, and storing the information on a file on the disk. The file can hold 1,000 program names. As each disk is inserted in the disk drive for cataloging, one gives it an assigned disk number. One can also give each program or subfile a two letter I.D. Code (for example, GA for game adventure). When all the disks are in memory, one can either ask for a complete listing, or one can call for a list on any sort field, either volume number, I.D. number, type of file (Integer, Applesoft, or Binary), or even by the number of sectors in a program. Yes, this program is the first to include the number of sectors for each program. The list can be sent to either the monitor or line printer.

There is no doubt about it, this is the best and most versatile master catalog program available.

PRONTO-DOS

Beagle Brothers Micro Software, Inc.
$29.50
48K; IIc

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	A	*Value for Money*

Pronto-DOS by Tom Weishaar is an excellent program at a very reasonable price. It is the latest of the DOS speed-up utilities on the market. *Pronto-DOS*, which can be reconfigured while being used, offers the following capabilities (used singly or in conjunction with each other): initializes new disks with itself, updates existing DOS 3.3 disks with itself, frees up almost one full track for data, can move a DOS up into the language card for an extra 10K of programming space, and offers bonus utilities as an optional part of the program. The optional utilities are the following:

(1) Adds a DOS Type command to automatically list text files.
(2) Allows Control-C to halt a catalog without rolling the top file names off the screen.

(3) Allows the Escape key to halt an Exec or Read command.
(4) Quickens the Save command by cancelling the Verify (which normally follows it).
(5) Can choose not to force a language card reload upon rebooting.
(6) Prints free space remaining when doing a Catalog.
(7) Prints a binary file address and length upon any BRUN or BLOAD.
(8) Allows initialization without putting a HELLO file on the disk.

The program disk I tested performed flawlessly. Its cute beeps catch your attention when you press any wrong keys or try to perform an operation that is not allowed. The documentation is effective and attractive, even if it is a little technical. Be sure to read the manual, however, before you alter DOS or any commands you are used to.

However great the program is, I wonder how many Apple users actually need its capabilities. If you usually run prepackaged, prewritten software, *Pronto-DOS* will do very little for you. The time and energy required to (1) make duplicate copies of your program disks (if duplicates are possible), (2) determine if the existing DOS is compatible with *Pronto-DOS*, and (3) test your software again to determine if it functions correctly after modification, are out of proportion if you just want to load a Hi-Res picture in three seconds instead of ten. The author of *Pronto-DOS* warns that copy-locked software should not be modified at all since it will ruin the copy-locked disk. And if all your data is in test files, *Pronto-DOS* does not speed up their reading or writing.

If you program your own software or compose software for resale, you might find *Pronto-DOS* very useful. On the other hand, if you do not understand the difference between a byte and a bit, or why one would want to put DOS on a language card, or that you can't display a text file with your existing DOS 3.3, this utility will only confuse you.

QUICKCOPY II

Telephone Software Connection
$40 (mail); $35 (Teledelivery)
64K; II/II+/IIe/IIc

Overall Rating	C+	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	N/A	B-	*Value for Money*

Graphics Quality: 3

QuickCopy II is a copy program designed for users of the Apple IIc who have only the single built-in disk drive to work with. It will copy any DOS 3.3 or ProDOS program or file disk in only two passes. That is, with a single drive the user only swaps disks twice during the copy procedure, making for a very fast and painless copy. It works on dual drive systems as well, but is slower for that purpose than many other copy systems. It took two minutes to copy files that Apple's COPYA utility did in a minute and a half.

The producers of *QuickCopy II* sell their products by mail or directly downloaded via modem. To facilitate modem orders *QuickCopy*'s instructions are graphically built into the program. Once past the title and advertisement, the user is treated to the sight of two disks which indicate by lowering when it is appropriate to load the master and the disk to be copied (slave). The program also checks the slave for any data. If the slave is not a blank it will ask twice if it is ok to overwrite before formatting the disk.

Again *QuickCopy II* was designed with a single drive in mind. The program places an id block on the final track of a formatted disk which it looks for every time the disk is changed. If the program cannot find that id block when disks are swapped it alerts the user. The id block is written over during the final pass.

QuickCopy II does not contain any other utilities and will not copy protected software. It is a good program and worth the money for anyone with a single drive.

UTIL

Microcomputer Workshops
$29.95
48K; II/II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	C	A	*Value for Money*

UTIL, a set of disk utility programs designed for Apple DOS 3.3 disks, perform a wide variety of functions ranging from retrieving information after a disk

has "blown," to protecting a disk from copying, to customizing DOS to fit your own preferences. However, several limitations exist. For one thing, the protection system will not stop advanced nibble copy programs. For another, *UTIL* can only rebuild the Directory track on a disk—it's intended for use only when you cannot catalog a disk.

This useful program may need a moderate amount of disk modification. A school could use the program to limit access to school records using the password option, or to make backup copies of record disks. The program allows you to increase disk space by up to twenty-five sectors by reducing the space allocated to the Catalog. It also allows you to change DOS commands, undelete files, and correct sector counts. *UTIL* has a wide variety of uses.

HOME/PERSONAL

Home/Personal

General

ASTRO*TALK

Matrix Software
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B+	B	*Value for Money*

Astrology has come of age with this software package by Matrix. You can use the computer to chart the planets for anyone at the moment of their birth anywhere in the world. When you have fed in all the necessary information concerning the date, time, year, and location (latitude and longitude) of birth, you can choose which information you want presented. The breakdown covers everything from "Who Are You?" and "Love Life" to "Appearance" and "Career Skills." Each of the twelve sections delves into different topics, depending on which house or position each of the planets occupied at the moment of birth.

The program also includes information concerning similar products available from Matrix Software. It also offers you different ways to get you more involved and make more money from astrology. A student astroguide allows you to ask questions and learn simple statements for interpretation, covering such things as signs of the zodiac, house positions, rising sign, and aspects. A small tutorial explains astrology. You learn the different forms of the zodiac, sidereal and heliocentric. You also have the option of using either frame of reference for the computations. If all else fails, the Help section covers everything you may need in order to answer questions concerning the operation of the program.

You can print out most screen displays by pressing the ? key. Unfortunately, the program prints out information in small sections, enclosed inside a border. A complete listing thus takes many pages, with little actual information included. I would have liked the option of printing out all information from each section. In that way, you could display a more professional-looking report.

*Astro*Talk* is not copy-protected. The author recommends that you back up the disk and place the original in a safe place—a good idea given that the package includes no information on backup disks or replacements. Two disk drives are optional, but highly recommended to avoid regular switching of disks. The manual, well-written and easily understood, contains many drawings showing each step necessary plus a full page of positions of major cities in the world. The program runs rather slowly due to the use of text files, but not slowly enough to be an annoyance. The error handling is excellent and everything works exactly as it should. This is an good program for people interested in their stars.

DRUM-KEY

PVI
$139.95
48K; II/II+/IIe
audio system (amplifier and speaker) required;
audio cable required for connection to computer

Overall Rating	C+	A	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B	C+	*Value for Money*

I know you've always wanted to play the drums, but never had the patience or dexterity—or the space to fit them into your den or living room. Well here comes *Drum-Key* with a solution. You need only supply your manual dexterity to the Apple II keyboard and the space necessary for your computer and an external audio system (an amplifier and speakers). The *Drum-Key* package contains a system disk (software), a card (hardware) to plug into an appropriate slot inside your Apple (#4 is recommended), and an operating manual. The card has an output jack to which you connect an audio cable (not supplied by the vendor) that's fed into the line input jack of the audio system.

After installing the card, connecting the computer and stereo, and booting up the system disk, you're ready to start "playing the drums" using the twenty-eight digitally-recorded (live) percussion sounds provided by *Drum-Key*. This set of sounds includes five cymbals (crash, ride, open, and two high-hats); two snare drums; four tom-toms; two congas; two bass drums; two hand claps; six electronic sounds; and a variety of other percussion accessories (cowbell, claves, rimshot, tambourine, and snaps). With these, the would-be drummer is ready to compose anything from simple rhythmic patterns to complicated drum solos or songs.

Selecting the first option on the main (utility) menu which appears after booting the system disk puts you into the main drum program and exhibits the Score Display on the screen. This display, consisting of sixteen horizontal staff lines labeled with one or two of the percussive sounds, is used for creating and editing patterns and songs note by note, or more appropriately, beat by beat.

If, at this point, you wish to bypass learning about these operational functions because you're eager to hear the sounds and rhythms your Apple can produce, press the ESC key and switch to the Keys Display. A portion (twenty-eight keys) of the Apple keyboard will be displayed and labeled with the appropriate percussive sounds, allowing you to instantly see which key creates the sound you want to hear. Depressing a key produces the corresponding sound out of the stereo and simultaneously flashes the image of the key on the screen. Without any further knowledge, you can begin to play a rhythmic pattern merely by depressing keys in sequence. I must admit that my first reaction was one of excitement.

After calming down, I set out to explore the more specific details about *Drum-Key*'s operating features. Unfortunately, my initial enthusiasm began to fade the more I got into the nitty-gritty of the capabilities of the hardware and software. While the software allows for a great deal of flexibility in terms of recording, editing, and playing back drum rhythm sequences, the hardware leaves much to be desired. The authors make a big fuss about the authenticity of their digitally-recorded live percussion sounds as compared to the unconvincing and amateurish quality of the synthesized sounds of drum machines found in most console organs.

Personally, I found many of *Drum-Key*'s twenty-eight sounds to be flat and not representative of the real McCoy. The main reason for this stems from the way in which the sounds are stored and played back. Each sound is assigned a time slot of fixed duration and a rhythmic pattern is formed by linking together ("time-division multiplexing," for the more technical minded) a group of time slots. Because of the fixed time slot duration, a sound created at the beginning of the slot dies instantaneously at its conclusion; thus there is no blending of sounds from one slot to the next. For example, a true cymbal crash would decay continuously in time, i.e., its effect would exist over many time slots. In *Drum-Key*, the sound of a cymbal crash decays over the short time slot and then instantantly terminates. It is this lack of fusion of percussive sounds from time slot to time slot that imparts a flat quality to the overall sound. Furthermore, each of the sounds has a fixed envelope waveform and no provision for amplitude modulation. Hence, loud and soft cymbal crashes are unachievable with *Drum-Key*.

There are many other obvious omissions from the hardware, such as dual sounds (a drummer typically has more than one cowbell), a woodblock, and drum rolls. Perhaps the most serious fault lies in the fact that all of the supplied sounds correspond to strokes made with drum *sticks*. Have the authors forgotten that drummers also use *brushes*? This major defect seriously limits the utility of *Drum-Key* in that the program is unable to produce many desirable rhythmic accompaniments, such as the smooth swing of a fox trot played with the brushes on an alternately open and closed high-hat.

The operating manual adequately describes the system's various operating features and their applications. These menu-driven features are, for the most part, quite flexible and easy-to-use. *Drum-Key* is a classic example of a package whose software far outperforms its hardware. Some of the nicest software features include:

1) The ability to build up complicated rhythm patterns by overdubbing one set of sounds on top of another.
2) Error correction or quantization that automatically places any out-of-time drumming into precise, evenly-spaced beats. The amount of error correction is variable (including none at all if the user is fully confident of his own rhythm). You may modify the error correction with the %Swing/Feel option to place more or less emphasis on the first half of the beat during recording.
3) A programmable audible/visible metronome that helps keep time in all modes (the audible click can be turned off).
4) Variation of tempo.
5) A Help screen that you can easily access at any time to refresh the user's memory about the system commands without having to refer to the manual.

In summary *Drum-Key* claims to be an electronic percussion instrument that creates rhythmic accompaniment for any kind of musical application—practice sessions, recordings, or live performances in the absence of a living, breathing drummer. Based on what I've

already pointed out, such bold claims by the vendor are misleading. Nevertheless, for a relatively low price (when compared to other state-of-the-art digital rhythm units), *Drum-Key* is probably worth owning for the sheer fun of playing around with it. But have no fear, Louie Bellson and Buddy Rich; your profession is not in jeopardy.

ENERGY MONITOR

Addison-Wesley Publishing Co.

This program targets professional energy managers. It handles data on energy use and conservation for one to ninety buildings. For a complete review, see the same program in the Business section.

FAMILY ROOTS

Quinsept, Inc.
$185.00
48K; II/II+/IIe/IIc

Overall Rating	A	B+	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	A-	A	*Value for Money*

Family Roots, a specialized database program for the serious genealogist, stores, modifies, searches, retrieves, displays, and prints out genealogical data. Obviously designed by one who understands the genealogical researcher's requirements, it is intended for the more serious researcher. *Family Roots* is well organized and simple to use; it would be a tremendous aid to anyone planning to research his "roots," or write a family history. The program will print all common data forms and sheets, such as pedigree charts, family group record charts, and ascending or descending ancestral listings for relatives to fill in missing data.

Family Roots consists of six main programs and six utility programs on two disks. Of the six main programs, *Edit* stores the basic input record data on each person, such as name, birth date, marital status, spouse, names of children, address, death, etc. *Charts* prints four standard genealogical charts that can be tailored to the user's requirements. *Sheets* displays or prints data sheets with all the information on an individual or a family, with the latter organized in the standard Morman format. *Lists* displays or prints listings of people in requested sequences.*Search* sorts data files by the field or element of information that the user desires. *Text* allows storage of notes, data, reports, or even a complete history on an individual that can be retrieved with related data on that person.

The utility programs allow you to prepare blank data disks, print address lists of living relatives, configure your particular system, and change program parameters and other program modifiers. Extensively menu-driven, the program is simple enough for either the inexperienced computer user or genealogist to use if the instructions are explicitly followed. The disks are not protected, so that the user has full access to the files and programs for archiving or incorporating changes. *Family Roots* is compatible with 80-column cards, clocks, and lower case adapters.

Most genealogy programs are limited to about 1,000 records, severely limiting serious researchers who may have up to 10,000 names to file. *Family Roots*, on the other hand, has unlimited records capability; but with larger databases, two or more disk drives are almost a necessity. The program supports up to six drives, and permits records on one disk to be interrelated with those on another. It also allows the user to define his own limits on the number of children or number of marriages, for instance, rather than working with a fixed number.

The Edit function provides all of the standard fields that a genealogist uses to record data (including footnotes). It allows up to nine user-defined fields to be added as a standard entry; records may be redefined to add or delete fields without having to rework previous entries. The Text feature supplements record entry, and can be important for allowing storage of notes or even unlimited pages to be linked to the standard record data. In all, it gives the user complete flexibility to design or modify his individual management and retrieval system.

By assigning an ID number to each person as he is entered, subsequent entries requiring data such as "parent of" or "child of" can be linked by entering only the ID number, saving both data entry time and disk space. The ID numbers are automatically numbered as you enter data, but they may be changed or reassigned if desired. Data entries are in the standard genealogical format of day/month/year, but entries in other formats such as "1891?" or "__/__/1787" may also be used. The Search capability allows sorting with as much flexibility as data entry. Searches may be made for all people living in a certain area in a range of years, or for all people with a common name or birthdate in a certain area. The print out capability permits using various printer fonts, while the parameter change feature permits revising a format to print out only specifically desired information.

The documentation is a comprehensive 175 pages with basics for the novice computer operator. Even so,

the manual is confusing at times, and may take some study to fully comprehend because of the many features and flexibility of the program. Better examples of screen displays would have been helpful. Moreover, setting up the configuration for printers (other than a Paper Tiger) is not well explained. Beyond that, however, the manual is complete and covers most problems and errors likely to be encountered.

The program has a few deficiencies. For one, the speed of the searches is slow. A "pointer" capability would have been helpful, allowing a few characters to represent a large number of data. For example, for a person with fifty ancestors, born, dead, and buried in Chicago, you are required to enter "Chicago, Cook County" three times in each record.

Family Roots comes the closest of all the geneaology programs now on the market to satisfying the widest range of the user's needs. The author of the program has anticipated almost everything that a serious genealogist could desire. The genealogist with a large data file, who desires a means to access and manipulate it, will love this program. There are many less expensive geneaology programs on the market, but *Family Roots* is probably the best value for the money of the serious genealogist.

THE FOOD PROCESSOR

ESHA Corporation
$120.00
48K; II/II+/IIe/IIc

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

I found *The Food Processor—The Computerized Nutrition System* a delight to use. In fact, aside from the food codes listed in the manual (for an awesome 1,500 separate items), the screens are so self-explanatory that I hardly found it necessary to resort to the manual. The beginner will use this program confidently within a few minutes simply by following the explicit directions given on each screen.

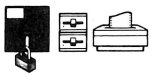
The authors derived the nutritional values of foods from current and authoritative sources. They give a detailed bibliography of the derivations and completely list 224 references. You can rapidly analyze and display the results for even the most obscure foods (including ethnic recipes) in terms of twenty-six vital nutrients.

The Food Processor runs rapidly on the Apple II, II+, or IIe with at least 48K of memory and one drive, but two drives and a printer simplify operation immeasurably, allowing the main program disk to reside in one drive and the nutritional data disk in the other. Both the program disk and the nutrition data disk are double sided. In addition to both sides of the data disk, nutrition data also occupies the reverse side of the master disk, listing nearly 2,000 separate items. The Main Menu allows you to look up foods and analyze them for all of their nutrients, to look up foods for one nutrient (such as cholesterol) or for calories, to compute your personal RDA (recommended dietary amount), and to store, add, change, or delete permanently stored data. The program calculates recommended dietary amounts on the basis of sex, age, pregnancy or lactation in women, height, weight, and, very importantly, levels of activity. You can select from five levels of activity, from sedentary to exceptionally active, such as lumberjack, coal miner, or rickshaw puller.

Any analysis shows twenty-six different ingredients, including the total calories, protein, fiber, various vitamins, cholesterol, fats, and various metals. The food groups consist of dairy products, meats, grains and flours, grain products, fruits, fruit juices, nuts, seeds and related products, vegetables, legumes and related products, entrees, recipes and other combinations including all fast foods, and miscellaneous groups including baby foods, baking ingredients, candies, condiments, fats and oils, sauces and gravies, etc., etc., etc. By simply typing in the code number you call up the item within approximately three seconds. You can then indicate the amount in terms of pieces, teaspoons, cups, ounces, pounds, or grams. Once you have completed this, the program gives you a nutritional summary, as a percentage of each item as a recommended daily allowance if desired. You can easily print this material. It lists foods very specifically. For example, it lists twenty-five different varieties of beans, subdivided into cooked, dried, canned, canned with pork, canned with sweet sauce, etc. Meats are lean with some fat, or lean only. Beverages, including alcoholic drinks from champagne to vodka, wines, diet drinks, and milkshakes are all listed individually. The lists of the various candy bars and cereals are quite mind-boggling, as are those for the cheeses, crackers, ice creams, and various desserts, and fast foods such as Egg McMuffins, Big Macs, Kentucky Frieds, and so on ad nauseum. You can readily calculate a detailed analysis of the most obscure of diets to the commonplace fast foods.

It's very hard to find a flaw in this program. It's embarrassingly easy to use, fast, and provides valuable and detailed information. An obstetrician in particular would find it valuable in advising pregnant or lactating women. Certainly dieticians working in a hospital environment can use it. A dietician could determine the actual nutritional content of the average hospital meal, or prescribe specific diets, such as those for diabetics or

for people who must avoid sodium. You can add various diabetic or low-purine diets (for gout patients) to the program, and it might well be enhanced by the addition of high-calorie elemental diets for severe nutritional problems, such as Vivonex, Ensure, or Meritine. I highly recommend *The Food Processor* for professionals. For the average person interested in diet, its long-term value would not last more than a few weeks, the time needed to accrue most of the information necessary to evaluate your diet. For the diet conscious amateur, I confidently recommend the cheaper but sound program, *Nutrition Design*.



THE HINDU VEDIC MASTER

Astro Dynasty
$295.00
48K; II/II+/IIe/IIc

Overall Rating	B+	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	B	*Value for Money*

Anyone who has a deep interest in Hindu Astrology, the Vedic philosophy, and the fixed star Zodiac will like this program. It accurately explores the nineteenth to the twenty-first century in the Hindu Siderial Zodiac with the customs option of a variable ayahamsha. Within this time period you can chart anyone anywhere in the world.

The first menu has three options: the Radix chart, the sixteen Vargas or the Vimshottari Maha Dasa or Ashtakavarga, Transits and Dasa.

The last part calculates the birth chart in Ashtakavarga on a split-screen, comparing it to the sixteen Vargas, signs, and deities, the four time cycles (or subperiods), the lunar rising, the transit chart for any date in the past, present or future. It also does synastry and compatibility analysis.

With a compatible parallel printer and a printer buffer card of 16K RAM or more the printout time is reduced to ten minutes. You can print about twenty-two pages worth of Vargas and birth charts, with one chart for each area. Areas include: wealth, family, general welfare and happiness, occupation and status of professional career, reincarnation and past lives, property, meditation and spiritual development, spiritual achievement and education, personality strength or weakness, avoiding misfortunes, habits, nature, and finally, a special chart for twins.

Included is a richly-detailed manual called "Data Entry on the Vedic Master." It contains 160 pages of tables, forms, and graphs which give concise instructions on data entry, right down to the necessary software changes.

The program takes about twenty to twenty-five minutes to run—a real time-saver considering how long it would take to calculate these charts by hand (usually about sixteen hours).

You have to sign an End-User Agreement, which works as a license. For an additional $20 you can sign up for a warranty that will give you future updates and service. This program—with its factual background and unique presentation of a Life Reading program—is recommended to anyone interested in Hindu Astrology and the Vedas

HOME ADDRESS BOOK

Opt-Systems
$19.95
64K; II+/IIe

Overall Rating	B	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	A	*Value for Money*

This simple but effective program keeps track of up to 402 families in an address file. It stores names, addresses, phone numbers, work phones, birthdates, wedding anniversaries, and comments.

Although data entry is easy, the format of the entry screen is, at times, hard to follow. Stored data can be printed in six reports, including a complete report for families, an address book, a telephone listing, a calendar report, a mailing list, or mailing labels. Entering information for the report is easy and prompt-driven. In fact, ease of use in this program is consistently exceptional.

The program is mostly menu-driven, with default values for most prompt-driven entries. The program contains a very nice error recovery system through a sortkey recovery module and an emergency recovery module. The password entry system has a default password that you can change, but you can't bypass. If you change password, forget it—there is no way to get into the program.

The documentation is complete and uses the interesting technique of directing advanced and novice users to use the appropriate chapters. Although most of this program's functions can be duplicated on a sophisticated database, the ease of use of this program and its very reasonable price make it a good choice for home address record keeping, especially for the novice.

MAGIC MEMORY

Artsci
$59.95
48K; Apple II/II+/IIe/IIc

Overall Rating	C	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	D	*Value for Money*

"Best described as an electronic address book" aptly describes *Magic Memory*. A system of menus allow you to manage disk drives, the video display, and printer options. The program can display 40, 70, or 80 columns. It uses one or two disk drives or a hard disk, and it writes data to standard DOS 3.3 disks, which helps assure compatibility with a range of other programs. The key to *Magic Memory* is its emulation of a tabbed address book. In the Memory Book mode, the screen displays a vertical row of inverse video letters on the right side of the screen. You have a choice of the letters A-Z or your own tabs with one to three letters to identify them. You choose a tab by positioning the cursor over it and hitting Return. This opens the address book and allows you to view the contents of that section. A status line displays the number of the current record, total number of entries in the category, tab name, and the number of entries "on hold," a temporary buffer used to transfer records from one tab setting to another. The display also includes a "view window" of from one to nine lines of the current entry, an entry list which reminds you of each entry in the tab section selected, and a summary of available commands. You can sort records in each tab section alphabetically or numerically.

The complete printer options allow a flexible array of simple lists or labels. The documentation is also complete and easy to follow, but novices may need patience and a rudimentary understanding of a printer's operation to understand the printer section.

Magic Memory fulfills its claims, but I am unconvinced that the average user would want to invest in something as limited as this program. Other filing database management programs could track the same data while offering far more powerful search and sort functions. Before buying this program, you should be quite sure that your needs are narrow and will remain so.

MENU II

C & H Video
$39.95
48K; II/II+/IIe/IIc

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	B	B	*Value for Money*

Menu II brings to the microcomputer a kitchen/diet aid that actually works. The program is well documented, and even a user new to computers should be able to follow the installation instructions. One of the program's best features is that it is unprotected, and the end user may make as many backup copies as he feels necessary. He also may enter the program and make minor changes to titles, categories, etc.

The menu-driven program and superior tutorial take the user easily through set-up and help him to develop menus for the three meals of the day. Two user-defined variables also allow him to keep track of calories, sodium, carbohydrates, etc. When the user inserts the variable he will also give a unit of measure, for instance, milligrams or calories. The program displays a running total of the assigned variable to help the user keep within assigned dietary guidelines.

After you have assigned parameters you must enter your database of recipes, probably the most boring task associated with the program. The authors provide a small database to help you get started, and they have made it extremely easy to move, change, or delete any original recipes. You can develop menus for periods as great as two weeks, print them out, or automatically make shopping lists from them. The shopping list may be printed either for exact measurements or rounded amounts. A good feature of the shopping list is the ability to add non-food items, and to expand the list. The program automatically assimilates into one amount different quantities of the same food item required by different meals. However, if one recipe calls for "Hamburger 1 pound" and another for "Hamburger 3 pounds," the quantities will not combine because "pound" differs from "pounds." The same applies to "oil," "cooking oil," and "olive oil." The program is well written, but the user must give it information in a very precise form.

The program also has a comments section for additional cooking instructions. I preferred simply to enter a page and volume reference to the cookbook from which a recipe originally came. This approach saves disk space and entering time, but still provides speedy access to the proper reference if necessary. Another good feature is the program's ability to automatically adjust quantities. When you enter a recipe, a screen prompt inquires how many it will serve. Later, you might want to feed the same dish to a different number

of guests. No problem, just enter the number of people you wish to serve, and the program will automatically adjust the quantities involved. Naturally, it will also adjust your shopping list to reflect the different amounts. If you plan to feed large crowds I recommend that you develop the initial recipe using large divisions like #10 can of tomatoes, or 1 pound of salt. No sense in having an updated program that asks you for 2,333 teaspoons of salt. The authors plan to bring out additional disks that will contain ethnic foods, such as Irish, Italian, German, and others. These culinary databases will sell for $15 apiece. The authors also invite users to send in their favorite recipes for inclusion on disk.

This household program is well written, well documented, and easy to use. It will make the chef want to bring the computer out of the closet and into the kitchen. Just be careful with the Hollandaise and in no time you'll find your Apple as big a help at kitchen management as your Cuisinart. It might also be useful to small restauranteurs and caterers.

MUSIC CONSTRUCTION SET

Electronic Arts
$40.00
48K

Overall Rating	A-	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C-	A	*Value for Money*

Music Construction Set leaps far ahead of its predecessors. It eliminates the need to enter musical notation via the keyboard. Instead, a moving hand roves around the screen, captures the various musical symbols, and transports them to the staff. You can find virtually everything you need to write down music: notes, rests, clefs, ties, dots, and so on. The program boasts flexibility as well. You can use a joystick or koala pad to guide the pointing hand, or the keyboard if you lack such peripherals. It works with the Apple speaker, supplying two musical voices, or Sweet Micro System's Mockingboard II, which offers a maximum of six simultaneous voices. The iconographic gauges that the pointer manipulates control the volume, sound quality, and speed of the music. Similarly, nine icons represent various functions. For example, the Home icon takes you back to the beginning of your composition. The Disk icon lets you save or retrieve files. A scissors and a glue bottle, the cut and paste icons, represent two powerful functions that allow you to edit and repeat small portions of musical notation which you would otherwise have to write each time. Using these two functions, you can even combine two separate musical files.

Keyboard shortcuts also save time. Rather than moving the hand up and down the screen grabbing and placing notes, you can produce the same results with a few strokes at the keyboard. Confining the roving hand to the staffs eliminates a lot of travel time. You can use one or both staffs available, and choose between treble or bass clef. Two and a half measures appear on the screen at all times. The Arrow icons permit movement both left and right, and you can easily transpose your music into any key as long as the highest and lowest notes do not exceed the machine's voicing limits. You get four time signatures, a note indicator, and a beat counter. To play the music, employ the Piano icon. The music scrolls across the screen if you have a Mockingboard II, but not if you have the Apple speaker (a flaw demanding immediate correction). The volume and sound gauges apply only to the Mockingboard as well. A keystroke command triggers the note indicator, which both names the note and plays it, facilitating placement on the staff. Finally, you can print out your music with a dot matrix printer.

Significantly, this program and others like it separate music from musicianship. Prior to the advent of the home computer, anyone interested in music had no choice other than to learn to play an instrument. *Music Construction Set* lets you focus on the elements of music, such as melody, harmony, and rhythm, rather than mastering the technique of playing piano, guitar, or violin. The computer won't replace musicianship, but it will help people become better musicians.

This program has other applications. Music texts come alive with *Music Construction Set*. A student who cannot play can hear the notes that appear on the paper after you enter them into the program. The Mockingboard II supplies sound wires to the exterior of the computer, making recording possible. Although the Mockingboard's tone quality lacks the musical quality you might desire, it still provides the opportunity to put your music down on tape so that others can hear your musical ideas. In all likelihood, the sound quality will improve or a competitor will design a more suitable synthesizing card. Music heard through the Apple speaker, on the other hand, sounds like a single, rather tinny, voice and definitely leaves something to be desired.

Despite the program's overall success, it has some serious shortcomings. It does not allow proper, accepted musical notation. For example, you cannot beam eighth, sixteenth, and thirty-second notes together, which means that you can end up with a fairly illegible composition. Also, chords must only contain notes with the same durational value. This means, for

example, that you cannot combine a whole note in the bass with three quarter notes above it, and triplets are impossible. Many other inconveniences become apparent to an advanced user, but the most annoying aspect is the significant alteration in the world of music to accommodate the computer. Clearly, the Apple has its limitations, at least partly to blame for the program's weaknesses. A program must cater to the user, not the other way around. Until this happens, I doubt that music instructors will incorporate such programs into their teaching.

The program's capacity provides another limitation: it handles only seven hundred elements per staff. That sounds like a lot, but when you start to build multiple voices and chords, the limit creeps up on you quickly. *Music Construction Set* also lacks repeat functions, which would lengthen the capacity because of the amount of repetition in much music. Another useful addition would give you the ability to link a number of files together without having to pause and reload. Finally, the literature supplied with the package seemed more confusing than helpful. In particular, the literature does not delve deeply enough into some of the special techniques involved with using this editor.

Music Construction Set represents a tremendous breakthrough in music software for the Apple. It provides the most direct method for grouping elements of music together to construct musical pieces. Your interaction with the program—plucking and arranging, just like an arcade game—encourages experimentation. Gratification is almost instantaneous, since you can immediately both hear and see what you have created. Finally, despite its flaws, the package clearly complements any musical education program.

MUSIC MAKER

subLOGIC Communications Corp.
$39.95
48K; II

Overall Rating	D	C-	*Reliability*
Ease of Use	D	C	*Error Handling*
Documentation	F	D	*Value for Money*

Music Maker is a music program designed for the writing, editing, and playback of music. Generated music can be played either through the Apple Speaker, or through an external amplifier and speaker system by directing the signal to the cassette output port. Programs can be saved to disk. No additional hardware is required.

There are several problems with *Music Maker*. First, this is a monophonic program, and thus limits its usefulness to even an amateur musician since only a single-line melody can be entered. Two-part compositions or chords are not possible. The available range is from F below Low C, to F# above High C, a total of fifty notes.

Moreover, the mode of music entry is very awkward, mainly because no musical staff is provided. This is the program's main fault. Entering each note is a mathematical process. For instance, Middle C is entered as the note; here a note is changed to a rest by hitting the Space bar. The Q indicates the note's duration (whole, half, quarter, eighth, sixteenth, thirty-second, sixty-fourth, 128th, up to 256 available); any note or rest can be dotted. The R indicates touch: regular, legato, or staccato. The 160 is the tempo's metronomic value, and can be increased or decreased in increments of 20 beats per minute.

There is no provision for measure bars; notes are numbered in sequence, 1 through 1,000. Thus, if you wish to edit a note in what would be the 16th measure, you must know the exact number of the desired note. To create or store a composition of more than 1,000 notes, the piece must be broken down into 1,000-note phrases (16 maximum), and then the phrases linked and played back in sequence.

Entering a piece of any length is a tedious experience, to say the least. The 32-page documentation adequately explains the program's awkward approach to music-making.

Color graphics can be added to the playback of any stored song by using the Kaleidoscopic Maestro option. However, the graphics are not imaginative and soon grow boring.

This program has very limited capabilities, is awkward and tedious to use, and is of no value to anyone who really wants to store, edit, and play back music.

NUTRITION DESIGN

Nutrition Design
$120.00
48K; II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Susan C. Pisias, a registered dietician, and Nicholas G. Pisias, Ph.D., formulated this program with the goal of providing food analyses and diet evaluation. Educationally oriented, it teaches you about your nutritional needs and how to choose foods. It analyzes twenty-six nutrients and food components and calculates the percentage RDA, or recommended dietary allowance, for

each of the twenty-six nutrients. The food data comes on a separate disk with 881 items listed numerically. These include commonly eaten foods, as well as fast foods, vegetarian diets, Mexican and Chinese foods, spices, cereals, and various beverages, from colas to whiskey sours. The foods divide into nine groups: fruits, vegetables, dairy products, meat, fish and eggs, grains, breads and cereals, and beverages, both alcoholic and nonalcoholic. You also get measurements of crude fiber.

The program is written in Applesoft and employs only one disk drive plus a 40-column video display. You can copy the two disks provided: the master program disk and the food nutrient data disk. You save your daily nutrient records on the program disk, expanding to initialized disks if necessary.

Nutrition Design recommends optimal (average) caloric intake based on age, sex, pregnancy, breast-feeding, and so forth. Printer output is labelled with your name and the date. You enter a day's diet in one session and the program analyzes it for you, readily printing the video output. You enter food options by number, entering ounces, decimal fractions of a cup, spoon, or pieces. The program also analyzes nutrient data for a selected food or recipe, such as an entire apple cake (incidentally, 17,434 calories and quantities of fat, carbohydrate, cholesterol, and sodium better left undisclosed to lovers of this delicacy). The program analyzes nutritional ratios, such as polyunsaturated to saturated fat, and gives recommendations. In order to provide you with more meaningful information, the program recommends that you enter data concerning your diet spanning several days. It then compiles averages and compares the results to your RDA. *Nutrition Design* supplies a mean percentage of RDAs for a five day period, with daily tabulations and averages if you desire. For example, succinct and appropriate dietary evaluations and suggestions for pregnant or breast-feeding women deal with intakes of calories, alcohol, calcium, iron, and zinc. If you enter a partial food intake, such as for breakfast and lunch, the program will select a variety of appropriate foods that fulfill your nutritional needs for that day.

I found this program extremely easy to use, with rapid and appropriate responses, specific menus, and a range of food adequate for most diets. It calculates RDAs on the basis of age and sex, pregnancy or breast-feeding, weight and height. However, it disregards activity levels and ambient temperatures. This is a serious drawback in that you can hardly compare the caloric requirements of a sedentary desk worker to those of a lumberjack or a coal miner.

The nonprofessional may find the program has relatively limited value (after a few weeks of use you will thoroughly establish your dietary patterns and evaluations). However, a doctor, especially an obstetrician dealing with pregnant and breast-feeding women, would find this an extremely valuable program with appropriate dietary recommendations. The excellent documentation further complements this well planned program. It runs rapidly, requires minimal computer expertise, and offers exceptionally good value for the money.

PROVERBS

Davka Corporation
$25.00
48K; II+/IIe

Overall Rating	B-	B-	*Reliability*
Ease of Use	C+	C-	*Error Handling*
Documentation	C	B	*Value for Money*

Have you ever been at a loss for words during a momentous occasion? How about that time you were down in the dumps because you couldn't understand why you'd been treated a certain way? Surely most of us can use a touch of ageless wit to bring a smile to the lips of someone who is hurt or troubled, or insight into those situations in life that seem most hopeless.

Proverbs contains aphorisms, folk sayings, and proverbs from many different sources—all post-biblical in nature. You select whatever germane saying you wish to view by typing in a certain word. The program presents you with an index consisting of fifteen different screens. Each screen is comprised of an average of twenty different subjects; any one of approximately 300 descriptive words will call up a short saying or proverb, with the name of the author affixed at the end.

Many of the subjects bring forth witty and thought-provoking sayings. Choose one of the words from the screen, type it in, and read whatever nugget of wisdom is subsequently presented to you on your display. Or you can try a "hit or miss" approach; in this way, you try using different words that relate to the subject for which you need an appropriate saying.

I must admit, I enjoyed a great many of the selections, despite their shortcomings. The displays are relatively easy to read on the 40-column display. Unfortunately, having to type in the descriptive word completely for the desired selection is sometimes problematical. Some of the words used are complicated and easily misspelled, making it necessary for you to page through the indices until you find the correct word, and either write down the correct spelling of the word, or take a chance on remembering it as you type in your choice.

The only serious flaw I found while using *Proverbs*

involved the formatting of the text in the selections, and the program's tendancy to have it scroll off the top of the screen. A time delay seems to be built-in, which permits you to view the last selection of a multiple list for at least a second or two. Unfortunately, very few people can read that quickly and they shouldn't have to. This would be a relatively easy problem for the people at Davka to correct; it's a shame that this flaw mars the user-friendliness of the product.

Lastly, let me leave you with a quote from selection 79 of *Proverbs*: "Only a genius or a fool will rush to put his thoughts into writing"—Moses Ibn Ezra-Shirat Yisrael. Put this into whatever context you deem appropriate!

ROADSEARCH

Columbia Software
$34.95
48K; Apple II/II+/IIe/IIc

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	B	*Value for Money*

This program helps you plot roads between major cities and highway intersections in the United States and Canada. The database contains information on over 400 points in the U.S. and Canada for planning routes. If you do a lot of travelling, you should find this a very useful program.

I found the program simple and interesting. You can list the cities in the database, list the road connections for specific cities, plot your own route, or let the computer plot a route for you. Additionally, you can change the average speed and miles per gallon figures used in the calculations. You also have the ability to change the distances in the database if new roads are constructed in the future. The manual contains a listing of all points in the database. Each city or junction is assigned a number. When using the program, you can use either the number or the city name. The program always asks you to confirm that it has called up the right place.

I found the "compute shortest route" function the most useful. This computes the shortest distance between the two points you enter. You can then check a roadmap and see if you like the route. If you do not like the route, you have the option of deleting some of the routes and asking for the next shortest route. For example, I asked for a route from Los Angeles to Minneapolis. The route plotted did not use freeways, and as I was also looking for the fastest way, I asked for a re-plot. When it did this, it routed me over freeways. The total distance was only twenty-one miles greater.

After a route is plotted, you can get printed reports. Three print formats exist. The first, a route summary, does not list any of the cities passed through if you do not have a route change. This comes in forty-column format, so it is easily readable on the screen. It gives you the routes taken and the time required. The route listing also comes in forty columns, giving all cities and intersections encountered and the times between each in addition to the total time. The detailed route listing comes in eighty columns and is hard to read on the screen. This not only gives you everything the forty-column listing gives you, but it also tells you how much gasoline will be used between points and lists both elapsed and remaining values. Gasoline consumption is figured using twenty miles per gallon and speed using fifty-two miles per hour. You can change these parameters and have the route figured again.

Overall, I find this an enjoyable, easy to use program, helpful to travelers.

ROADSEARCH PLUS

Columbia Software
$74.95
48K; II/II+/IIe/IIc

Overall Rating	B-	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	C	*Value for Money*

This updated version of the original *Roadsearch* retains all the features of the original but adds some new ones. The purpose remains one of plotting routes between cities. The most useful feature added to the program lets you enter your own cities and roads. With the original, you could only change the mileage between existing cities, but now you can add up to fifty cities and one hundred road segments to the database with very little effort. The manual clearly explains how to accomplish this, providing an easily followed example. In my own case, I live in a suburb of Los Angeles. With the original *Roadsearch*, I had to use Los Angeles as my base city, which did not give me a true route plan. With *Roadsearch Plus*, I entered my own city plus some connecting roads, which enabled the program to give me an exact route.

Another plus is the publisher's sponsorship of a user's group, including providing updates for the database. When you register your program, your name goes on the publisher's mailing list to receive database updates for a year after purchase. You are also invited to send in new routes; if you do, your name remains on the mailing list for an additional year.

Is this program worth the additional cost? Again, it depends on the usage you plan for it. If you want to plan a lot of trips and want them to reflect actual rather than approximate routes, the answer is yes. Once you have modified the database, you can always remove some of your modifications to plot new routes. If you just want something to play with and plan only occasional trips, the answer is no.

SUNDAY 1.4

Ecotope
$295.00
64K; II+/IIe/IIc

Not exactly geared for amateurs, this program is recommended for people who want to design their own home or for professional architects and construction experts. For a complete review, refer to this program in the Business section.

Psychology/Self Improvement

THE DREAM MACHINE

Psychological Psoftware
$49.50
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	B+	B	*Reliability*
Ease of Use	B+	C	*Error Handling*
Documentation	B-	B+	*Value for Money*

The Dream Machine helps you analyze and log your dreams. The author, psychologist Patrick Nidorf, proposes that dream analysis aids continued growth and self-understanding. You may find his program worthwhile even if you just want to consider, catalog, diagnose, and attempt interpretation of your dreams. The double-sided disk comes with an adequate ten-page manual and a 120-page softcover book, *Beyond Dreaming—Tools for Psychic Development*, written by Dr. Nidorf in 1979. The eleven menu choices cover the four parts of the program: onscreen tutorials introducing the concepts, questionnaire followed by dream analysis, a dictionary of common meaning for some 200 dream topics, and a dream log for entering and grouping your dreams. The fully menu-driven program has no options for hardware configuration and little tolerance for entry errors. Much of it is simply text on the screen, with some computer interaction. This program is not pure entertainment. It takes commitment for you to catalog dreams over time, but the patterns are more meaningful than interpretation of a single dream.

I found the "Object Interpretation" section too mechanical, since the object you choose is just plugged into sentences for interpretation. The result seems superficial. The "Analysis of Dreams" section was necessarily limited in scope, since dreams should be understood in context of personality, current living situation, and past history (including drug, alcohol, and prescribed medication use). These limitations are not discussed in the introduction, although it does stress the seriousness of the undertaking and the importance of honesty. The informative "Dream Dictionary" may be the most useful part of the program, but the accompanying book goes much further than the program in stressing the relationship of dreams to reality. I did like the positive outlook of the presentation, and can recommend *The Dream Machine* to people who want a better understanding of themselves.

INTIMACY, THE ART OF COMMUNICATION

Psychological Psoftware
$39.50
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B-	A	*Value for Money*

Pychological Psoftware in California has produced at least six self-help programs. Clinical psychologist Dr. Patrick X. Nidorf wrote *Intimacy, the Art of Communication*, which helps you analyze your significant relationship (assuming you have one). This worthwhile, easily run program comes in seven sections on a copy-protected disk. You can purchase a backup for $5.00 by mail. The brief but otherwise adequate documentation offers no references or explanation of theory.

The program starts slowly with a wordy lesson suggesting that you "share your real self." Try not to let other such trendy terms detract from the otherwise professionally sound lessons. Certainly the explanation of what we all want out of a relationship is right on target: to be loved, to be the most important person in another's life, a sense of security, good communication, and having our needs met. These initial concepts lay a good foundation for the rest of the program, which gains momentum with clever text movement and simple graphics (why not in the first section?). You learn the rules for disagreements, listening, and compromise; thorough examples and an opional outline review make good use of the computer's potential. Four separate questionnaires, all useful and entertaining, also help you analyze your relationship. The first two analyze your communication skills and determine whether

your relationship (geared more for married couples, according to some of the questions) needs help. The narrative analysis prints to the screen or to your printer (primitively).

Between the exercises a dynamic, onscreen demonstration illustrates the communication skills just analyzed. The computer performs as no book can, moving text cleverly to compare your literal words with the actual meaning communicated. Next you answer twenty-five questions about how well you know your mate. Some of the questions may seem less than pertinent ("Where were your other's grandparents born?"), but they make the point that to learn about someone you care for, you must ask questions. Thirty true or false questions on evaluating your relationship follow, but the compound nature of some questions make it difficult to answer without dividing them.

The unpolished analyses vary little whether diagnosing a healthy or unhealthy relationship. Single-sentence analysis of each response rather than of the total score fails to make use of the computer's ability to provide a more reliable interpretation, but it does provoke consideration (sometimes inconsistent) about your relationship.

As a clinical pyschologist, I believe that people often reveal themselves more honestly to a machine than to a therapist. I would advise running the program while alone for private consideration, or with your significant other for stimulating discussion. This program can help you start if you want to analyze a significant relationship, but don't expect it to help you get one. I liked it a lot, and thought it well worth the money.

ON BECOMING A HERO

Psychological Psoftware
$39.50
48K; II/II+/IIe/IIc

Overall Rating	B	C	*Reliability*
Ease of Use	B-	C	*Error Handling*
Documentation	C+	B	*Value for Money*

How do you rate yourself? Do you follow the crowd? *On Becoming a Hero* helps you answer such questions about yourself and gives you some insight into what makes you act the way you do. The program does this by asking you to answer questions on what you do and don't like, do, say, and think. The opening menu presents you with eight different options, including an evaluation of your character, an evaluation of your maturity, how to solve your problems, and even how to choose your values. If you work your way through the program from the beginning, you narrow down your values by choosing which of two statements is more important to you in a progression that leads you to those you feel most important. The program then gives you a breakdown on just what your values mean and what type of person you want to be.

A series of true and false questions determines your maturity. The program then shows you what personality areas need improvement and offers practical suggestions to help you. You can also evaluate your character by answering twenty-six multiple choice questions. You can print out your personality profile, giving you a copy of your responses plus ways to better your ideals and responsibility. Like the other sections, this one remains somewhat general. Obviously, no one can describe all possible results, but the program does help you develop guidelines to reassess what you find most important in your life. Finally, you can summarize all of the completed sections and print out the results on the screen or to the printer.

Although written mainly for teenagers, this program suits older people as well. Because all the questions are personal, the program does not save them or allow others to observe them without your permission. This fosters honest expression of your feelings and desires. The manual gives a short overview of each section, the program itself containing all the directions. *On Becoming a Hero* doesn't answer all your questions, trying instead just to bring ideas to your attention so that you can adjust yourself closer to your ideal. It helps you work out problems that may have given you trouble before, or helps reinforce your ideas on what you want from life. I enjoyed the program and feel that it can help anyone whose values need clearer definition.

PERSONALITY PROFILE

Psychological Psoftware
$39.50
48K; II+/IIe/IIc/III in emulation

Overall Rating	B-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	C+	*Value for Money*

Personality Profile tries to help you better understand yourself. As usual in personality inventories, the program asks fourteen multiple choice questions on how you feel about yourself, how you feel about others, and how you deal with emotions. You respond on a scale of one to four. *Personality Profile* then prints a narrative description of your personality to the screen

or your printer. Five tutorials follow the personality analysis: personality development, anger, helping/rescuing, indulging/nurturing, and discounting and stroking. They remain superficial, briefly describing the five topics with onscreen pages of text. One tutorial concludes "We need to rely on our common sense and intuition—and hope for the best." This implies that behavior is out of our control, an inaccurate idea that detracts from the program's value.

While answering the multiple choice questions it proves impossible to change an answer without starting over. I doubt that this is a program deficiency, since it probably helps obtain an accurate analysis. *Personality Profile* is otherwise easy to use and fully menu-driven. The disk is not copy-protected, which gives you the option of storing the analysis to disk or printing it out. The documentation, although brief, is adequate even though it fails to describe the population postulated as normal for the analysis, or the theory behind the conclusions. In addition, any analysis derived from only fourteen questions must be limited in scope. Nonetheless, the personality analysis is concise and reads well when you answer the questions seriously. Just don't expect it to replace a complete psychological test battery or evaluation by a professional psychologist. It can offer new insights or food for thought, and can earn its $39.50 price tag.

STRESS MANAGEMENT

Psychological Psoftware
$39.50
48K; II/II+/IIe/IIc

Overall Rating	B	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	B+	*Value for Money*

A psychologist, Dr. Patrick Nidorf, has combined self-diagnosis and seminar in his interesting program *Stress Management*. Accompanied by brief but adequate documentation, the copyable disk begins with a stress quotient questionnaire. You rate your response to situations on a scale of one to four, ranging from "doesn't bother me" to "drives me crazy." The resulting analysis evaluates the stress in your life and how you handle it. Then the program defines stress, and suggests exercise, diet, meditation and self-hypnosis as means of reducing it. Exercise receives the highest ranking. The program does not tell you how to hypnotize yourself or meditate, but these two suggestions should not deter the conservative from considering the program.

The "Friendly Talk" seminar discusses the importance of making life more fun. A chatty style conveys the idea that a good perspective on life means knowing what's important and what's not. More questions lead to the Stress Graph, a bar graph of your personal stresses from sex to finance. Finally, the Nidorf Stress Scale ranks the psychological impact of life's stresses, from serious accidents to getting a traffic ticket. Like the bar chart, the scale, covering twenty-six points, fails to help you with further evaluation.

I am a licensed psychologist, not a computer hacker, but I found the program easy to run as well as professionally accurate. It offers good variety, mixing questions, text, answers, and charts. It also makes good use of the computer's capacity to accept user participation and prints results to the screen. While necessarily limited in its achievements, *Stress Management* is informative, enjoyable, and worth the price.

Recreation

BAT-STAT

Rainbow Computing, Inc.
$49.95
48K; Apple II+/IIe/IIc; DOS 3.3

Overall Rating	B-	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	B-	*Value for Money*

Bat-Stat is a good, efficient program for maintaining baseball batting statistics for your local softball or Little League baseball team. It comes with a well written, eleven page manual that enables you to master the program within an hour. No aspiring softball or baseball coach should be without it. However, I've assigned it a rating of B- because the program does a good job of providing complete statistics for softball (its original purpose), but falls down where baseball is concerned. It just doesn't offer enough information. It could be much stronger if it allowed more statistical categories. For softball, it's efficient and easy to use.

Bat-Stat tracks statistics in the following departments: At Bats, Runs, Hits, Batting Average, Doubles, Triples, Home Runs, Sacrifices, Walks, and RBIs. It should also include: Stolen Bases, Strikeouts, Errors, Put-Outs, and Assists. It seems overly optimistic to include walks and not strikeouts, which are more a part of baseball statistics. A later revision including more statistics would make *Bat-Stat* a much more powerful asset to the serious league.

The program also maintains a team roster file, which you can view on the screen or print out on an 80-column printer. The report lists each player with two lines of statistics, the top line indicating the last game played and the bottom line the up-to-date season stats.

I look forward to the future releases I expect for this very promising program.

LEAGUE REGISTRATION

Market Computing
$150.00
48K; II+

Overall Rating	B	B	*Reliability*
Ease of Use	B	C-	*Error Handling*
Documentation	B	B	*Value for Money*

League Registration is a management tool that allows you to keep track of team players in a league. This fairly well documented program facilitates the preparation of rosters and insurance records and helps officials and coaches keep league records accurate and up to date.

Several areas may give you problems. Error handling could be much better. Beware of accidentally pushed keys that may cause the cursor to skip a line. Also, exercise care when prompted to choose the printer or screen for a report, because the program accepts any entry, not just a "Y" or "N." Still, with those problems kept under control, *League Registration* offers you a great deal, Little League coaches in particular.

LEAGUE SCHEDULING

Market Computing
$125.00
48K

Overall Rating	B	A-	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	B	*Value for Money*

No recreation or athletic department should be without this excellent-working program. It definitely puts an end to favoritism in sports scheduling. First it asks you to list all teams in the Round-Robin style league or conference, inquires which days in the week your league can play, prints out all playing dates (on an 80-column printer in slot 1) and asks you if you find all

the playing dates acceptable (to account for holidays), and finally prints out the schedule. *League Scheduling* also keeps league information, including each coach's name, address, and two telephone numbers, and has a built-in program for mailing labels.

League Scheduling really does take all of the headaches and possible bias out of scheduling sporting events. The scheduling committee can simply blame the computer if one team ends up with an easy schedule. The program can maintain an unlimited number of different leagues because it stores all league information on a separate data disk. Moreover, you can copy the program disk.

To test the program, I fed it information on all the Pacific-10 Conference teams and ran out a fictitious schedule for 1983. It took me two hours. The program did a very good job, although not perfect because it doesn't allow for such luxuries as nonconference games. To cover this option, I entered two additional teams called Bye and Bye2. A team could then arrange to play any opponent it desired when the schedule pitted it against a Bye. I did find one serious flaw. I thought I had finished the project when I noticed that two teams played one less Bye than the others. I attempted to read the schedule into memory but couldn't. If I needed to change the schedule at that point, I would have to reconstruct it on the computer. I found it much easier to simply write the change on the printout.

League Scheduling gives you printouts of all playing dates, the entire day-by-day league schedule, and a team-by-team schedule. It does a complete job very quickly. The documentation is excellent and the program easy to learn. This program works with *League Standings* and uses the same data files.

LEAGUE STANDINGS

Market Computing
$100.00
48K

Overall Rating	C	D	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	A-	C	*Value for Money*

League Standings works with *League Scheduling*. The two programs really should be marketed together, because if an athletic organization needs to computerize its schedule it might as well do the same with the standings. This program maintains results and standings for as many as fifty different leagues of up to one hundred teams each. Both programs use the same data disks when dealing with League information, so you need keep only one file on League information (each team's mailing address and telephone numbers). You enter the results at the conclusion of each playing date and the program automatically updates standings, then prints them out. The teams appear in their proper order with wins, losses, ties, percentages, and games back listed.

I rated the program "C" mainly because of its failure to handle ties properly. The program treats a tie like a loss or no-win. For example, a tie in football is treated as both a win and a loss. If a team has two wins, one loss, and one tie, the winning percentage should be .600, but *League Standings* calculates .500, indicating that the team lost as many games as it won. When I played out a fictitious league over a nine game schedule, the program could not tell the difference between a 6-2-1 record and a 6-3-0 record. Among the major sports, only football and soccer allow ties, so other sports leagues encounter no problems with this program.

League Standings does everything else it sets out to do very well, including listing the scores from all games played on a particular day. I found it extremely easy to learn and operate, and editing was no problem. If your organization already has or plans to buy *League Scheduling*, you should also invest in *League Standings*.

NFL FOOTBALL— THE GOLD EDITION

Systems Design Lab (SDL)
$199.50
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

If you're a pro football enthusiast and plan on handicapping the weekly NFL football games, then you realize the importance of good information as well as sound predictions. The *NFL Gold Edition* was designed for this purpose. The program is modular in design and has a series of menu screens that allow you to move easily from one section to another. The program is very flexible and user friendly. In most cases you may go from one section to another and bypass the menu screens when using any of the eleven standard commands. Teams may be referenced by the team number or by entering the team name itself. All information in the data file can be changed at any time. Thus, if you make a mistake, you can easily go back and make corrections to bring the data file up to date.

The program may be used year after year and does *not* require annual data file updates from the publisher. You can create a data file for all 29 pro teams in any past season or any future season as the information becomes available, so in the event of a strike or schedule change, the data file can be changed accordingly.

The *NFL Gold Edition* package includes a system diskette, a data diskette, and over 100 pages of comprehensive documentation. *The Gold Edition* also provides a series of weekly reports and graphs that let you locate and identify profitable trends. For instance, if you wanted to know what percentage of the time Baltimore covers the Las Vegas line as an underdog at home, the reports will tell you. Similarly, if you wanted to know what percentage of the time all underdogs at home cover the line, reports make this information available. In addition, the reports provide team by team prediction summaries, weekly prediction summaries, season to date prediction summaries, as well as bar graphs, so you know exactly where you stand against the Las Vegas line at any given point in time.

The program can predict real or hypothetical games for the current week or prior weeks. It can even predict all games in the season to date. This is especially useful when a change or correction has been made to an early week and you want to bring the entire season up to date.

For this review, the *Gold Edition* was tested against the Las Vegas line for the 1980, 1981, and 1982 seasons. I obtained data on the Las Vegas lines from *Nation-Wide Sports Publications*, Los Angeles (also known as *The Gold Sheet*). The results are based on all games from week six through Superbowl week (weeks one through five have not been included because the program requires about five weeks of data before using the picks for betting purposes). The percentage of wins against the Las Vegas line for the 1980, 1981, and 1982 seasons is 65.4%, 62.5%, and 61.4%, respectively. The overall average for the three seasons (389 total games) was a profitable 63.9%. Picking underdogs for the same period (224 total games), the computer won 67.0% agains the Las Vegas line.

In short, the *NFL Gold Edition* is a very flexible and versatile program capable of generating excellent win percentages over the Las Vegas line. If you enjoy handicapping the weekly NFL football games, then you'll certainly find this program worthwhile.

SWIM MEET

Market Computing
$145.00
48K; Apple II+; DOS 3.3

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B+	A-	*Value for Money*

Swim Meet is an organizing and management tool for competitive swim meets. It helps you register individual contestants by name and team, assign contestants to meet events, assign lanes in both six and eight lane pools, and track qualifying times for contestants. If you have a printer, the program also helps you generate printed heat sheets for seeded preliminary and final timed events. It also prints standing sheets.

You don't have to be a computer whiz to operate *Swim Meet*, but you do need to know how to set up the Apple and two disk drives. Once you've set up the disk drives properly in slot 6, you simply load the disk to get to the program menu and choose your options. The first really appealing feature is the program's screen formatting. It also has clear and easily understood menu options and comes with a clear and concise manual of operating instructions. On the other hand, it has two less desirable features. First, it offers no catalog of events from which to choose. You must enter the event name yourself. Second, *Swim Meet* really seems to take its time when performing certain functions, perhaps because it's written in BASIC. It would have been considerably faster if written in CP/M.

Everything considered, I thought *Swim Meet* a well written program that will save you a lot of work if you manage aquatic activities.

TENNIS DRAW

Market Computing
$60.00
48K; II+

Overall Rating	B+	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	C-	B+	*Value for Money*

This efficient program maintains any type of racquet tournament. It registers players and teams (men's and women's singles and doubles categories) in tournament events and develops a single-elimination random draw. You can enter from eight to sixty-four players or teams in up to twenty-one events. *Tennis Draw* was designed to follow the United States Tennis Association (USTA) guidelines.

Of all of Market Computing's easily learned programs, *Tennis Draw* is the easiest of them all. You can learn it in less than thirty minutes. I gave the documentation a low grade because I don't think it's very informative, but you hardly need it for this program, anyway. Simply select a function from one of two menus and the screen gives you all the direction you need.

Tennis Draw solves all pairing decisions in a given tournament, regardless of the number of entrants (between eight and sixty-four, that is). It will automatically set up preliminary matches if the number of entrants is not divisible by four. It also seeds the top players in the tournament, using your grading system. Very nice.

USFL FOOTBALL—THE GOLD EDITION

Systems Design Lab (SDL)
$199.50
48K; II/II+/IIe/IIc/III in emulation mode

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

The *USFL Gold Edition* was designed for those pro football enthusiasts who enjoy handicapping the weekly USFL games. The program is similar in design and function to *NFL Football—The Gold Edition*, also by SDL (please see review of that program in this book). The program was tested against the Las Vegas line for the 1983 season. The following results are based on all games from week six through the end of the regular season (weeks one through five have not been included because the program requires about five weeks of data before using the picks for betting purposes). The percentage of wins against the Las Vegas line for the 1983 season (78 total games) was a profitable 61.5%. With the NFL version of this program, the underdog picks were the best. However, it won 55.6% of the underdog picks (36 total games), and 66.7% of the favorite picks (42 total games).

The *USFL Gold Edition* performed exceptionally well against the Las Vegas line during the first USFL season. If you enjoy handicapping the weekly USFL football games, this program is for you.

Vendors

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Beagle Brothers Micro Software, Inc.
3990 Old Town Ave., Suite 102C
San Diego, CA 92110
(619) 296-6400

Behavioral Engineering
230 Mt. Herman Rd. #207
Scotts Valley, CA 95066
(408) 438-5649

Biosource Software
2105 South Franklin, Ste. B
Kirksville, MO 63501
(816) 665-5751

Blue Chip Software
6744 Eton Ave.
Canoga Park,. CA 91303
(818) 346-0730

Blue Ridge Software
P.O. Box 461
Merrifield, VA 22116(703) 448-8080

Bluebush, Inc.
3379 St. Mary's Pl.
Santa Clara, CA 95051
(408) 244-1631

Blyth Valley Software
Box 1
Oakhurst, CA 93644
(209) 683-4735

Boston Company, The
One Boston Place
Boston, MA 02106
(617) 722-7939

BPI Systems, Inc.
3001 Bee Cave Road
Austin, TX 78746
(512) 328-5400

BrainBank, Inc.
220 Fifth Ave.
New York, NY 10001
(212) 686-6565
(800) 682-6565

BrainPower, Inc.
24009 Ventura Blvd., Ste. 250
Calbasas, CA 91302
(818) 884-6911

Broderbund Software
17 Paul Dr.
San Rafael, CA 94903
(415) 479-1170

C & H Video
110 West Caracas Ave.
Hershey, PA 17033
(717) 533-8480

CalcShop, Inc.
P.O. Box 1232-TW.
Caldwell, NJ 07007
(201) 228-9139

Cardinal Health System
7562 Market Place Dr.
Eden Prairie, MN 55344
(800) 328-0180
(612) 941-5170

CBS Software
One Fawcett Pl.
Greenwich, CT 06836
(203) 622-2614

CDEX Corp.
1885 Lundy Ave.
San Jose, CA 95131
(408) 263-0430

CE Software
801 73rd St.
Des Moines, IA 50312
(515) 224-1995

Central Point Software, Inc.
9700 S.W. Capital Highway, Ste. 100
Portland, OR 97219
(503) 244-5782

Climate Assessment Technology
11550 Fuqua, Ste. 525
Houston, TX 77034
(713) 434-3603

Columbia Software
5461 Marsh Hawk Way
Columbia, MD 21045
((301) 997-3100

Commercial Software Systems, Inc.
7689 W. Frost Dr.
Littleton, CO 80123
(303) 761-8062

Comp Ed
8626 N. 48th Dr.
P.O. Box 35461
Phoenix, AZ 85069
(602) 931-7233

Compu-Risk Software
1326 Wilder St.
Thousand Oaks, CA 91362
(805) 497-6200

Compu-tations, Inc.
P.O. Box 502
Troy, MI 48099
(313) 689-5059

Compumax
P.O. Box 7239
Menlo Park, CA 94026
(415) 854-6700

Compuserve, Inc.
5000 Arlington Center Blvd.
Columbus, OH 43220
(614) 457-8600
(800) 848-8199

Computek
28278 Enderly St.
Canyon Country, CA 91351
(805) 252-4244

Computer Asset Management
P.O. Box 26743
Salt Lake City, UT 84126
(801) 964-0391

Computer Colorworks, The
2656 Bridgeway
Sausalito, CA 94965
(415) 331-3022

Computer Learning Center
P.O. Box 110876
Tacoma, WA 98411
(206) 474-5808

Computer Tax Service
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Incline Village, NV 89540
(702) 831-4300
(702) 832-1001

Computing
2519 Greenwich
San Francisco, CA 94123
(415) 567-1634

Compuware
15 Center Rd.
Randolph, NJ 07869
(201) 366-8540

Condor Computer Corp.
2051 S. State St.
Ann Arbor, MI 48104
(313) 769-3988

CONDUIT
University of Iowa,
Oakdale Campus
Iowa City, IA 52242
(319) 353-5789

Control Data Corp.
HQB02G, Box 0
Minneapolis, MN 55440
(800) 233-3784

Courseware, Inc.
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San Diego, CA 92131
(619) 578-1700

Crawford Data Systems
350 N. Lantana, Ste. 561
Camarillo, CA 93011
(805) 484-4159

Creative Computing
P.O. Box 789-M
Morristown, NJ 07960
(201) 366-8540

Creative Software
960 Hamlin Court
Sunnyvale, CA 94089
(408) 745-1655

Cross Educational Software
1802 N. Trenton
Ruston, LA 71270
(318) 255-8921

Cygnus Software
8002 East Culver
Mesa, AZ 85207
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Data Security Concepts
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(314) 965-5044

Data Transforms, Inc.
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Denver, CO 80203
(303) 832-1501

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Encinitas, CA 92024
(619) 436-5055

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Chatsworth, CA 91311
(818) 709-1202

Datasoft, Inc.
19808 Nordoff
Chatsworth, CA 91311
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Davidson & Associates
6069 Groveoak Place #12
Rancho Palos Verdes, CA 90274
(213) 373-0971

Davka Corp.
845 N. Michigan Ave., Ste. 843
Chicago, IL 60611
(312) 944-4070

Decision Programming Corp.
5640 Nicholson Lane, Ste. 103
Rockville, MD 20852
(301) 231-6373

Decision Tree Software
2625 Burgoyne Rd.
Deland, FL 32720
(904) 736-7970

DesignWare, Inc.
185 Berry St. Bldg. 3, Ste. 158
San Francisco, CA 94107
(415) 546-1866

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Allen, TX 75002
(214) 727-3346

Dickens Data Systems, Inc.
478 Eagle Dr.
Tucker, GA 30084
(404) 448-6177

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Canada V5Z 4C9
(604) 687-3468

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San Antonio, TX 78249
(512) 692-1201

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Portland, OR 97204
(503) 243-3313

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Rockford, IL 61111
(815) 877-1343

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P.O. Box 300
Princeton, NJ 08540
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(800) 222-0081 (Orders)

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Webster, NY 10580
(716) 671-618-

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Niles, IL 60648
(312) 647-1270

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Eugene, OR 97403
(503) 344-3383

Ecotope
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Seattle, WA 98112
(206) 322-3753

Edu-Soft
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Berkeley, CA 94702
(800) Edu-Soft
(415) 548-2304

Eiconics, Inc.
P.O. Box 1207
Taos, NM 87571
(505) 758-1696

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San Mateo, CA 94403
(415) 571-7171

Epilepsy Foundation of America
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Landover, MD 20785
(301) 459-3700

EPYX
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Sunnyvale, CA 94089
(408) 745-0700

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Salem, OR 97302
(503) 585-6242

Evergreen Data Analysis, Inc.
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Evergreen, CO 80439
(303) 674-0253

First Star Software, Inc.
22 East 41st St.
New York, NY 10017
(212) 532-4666

Floppy Enterprises
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Eau Claire, WI 54701
(715) 835-0310

Flowersoft
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Manteca, CA 95336
(209) 239-2116

Fountain Computer Products
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Lakewood, CO 80215
(303) 232-8346

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Middletown, OH 45042
(513) 424-6733

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Spring Valley, NY 10977
(800) 431-2818

H.A.L. Labs
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6711 Valjean Ave.
Van Nuys, CA 91406
(818) 901-8828
(800) 468-4222

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San Diego, CA 92101
(619) 231-6616

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Alexandria, IN 46001
(317) 724-4429

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Lowell, MA 01854
(617) 937-0200

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Norcross, GA 30092
(404) 449-8791

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Oklahoma City, OK 73146
(405) 524-4359

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La Jolla, CA 92037
(619)454-0121

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4300 W. 62nd St.
Indianapolis, IN 46206
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(317) 298-5564

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Northridge, CA 91324
(818) 993-8536

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Mountain View, CA 94043
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New York, NY 10021
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Newark, CA 94560
(415) 797-9600

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Cambridge, MA 02138
(617) 492-1031

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Peterborough, NH 03458
(800) 843-6700

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(516) 549-3000

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(203) 335-0906

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(301) 365-3297

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State College, PA 16804
(814) 238-8294

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Bloomington, MN 55435
(612) 944-2624

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San Francisco, CA 94126
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Island Software
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Lake Grove, NY 11755
(516) 585-3755

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Port Washington, NY 11050
(516) 944-9304

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Hammett Place
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Braintree, MA 02184
(617) 848-1000

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San Jose, CA 95131
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Stonybrook, NY 11790
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Corona, CA 91720
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Menlo Park, CA 94025
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Palo Alto, CA 94302
(415) 854-4400

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Roslyn Heights, NY 11577
(516) 621-1540
(800) 645-6564

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Santa Monica, CA 90401
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(415) 964-6300

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St. Louis, MO 61339
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North Wilkesboro, NC 28659
(919) 838-4166

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Ellicott City, MO 21043
(301) 465-3175

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Kansas City, MO 64134
(816) 793-7738

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(617) 577-8500

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Santa Clara, CA 95050
(408) 980-0160

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21115 Devonshire St., Ste. 337
Chatsworth, CA 91311
(818) 700-0510

Malibu Softcorp
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Malibu, CA 90265
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Huntington Beach, CA 92646
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Baltimore, MD 21211
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San Diego, CA 92121
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Georgetown, Ontario L7G 4X6
Canada
(416) 877-0171
(416) 846-0646

Micro Decision Systems
Box 1392
Pittsburgh, PA 15230
(412) 854-4070

Micro Lab
2699 Skokie Valley Rd.
Highland Park, IL 60035
(312) 433-7550

Micro League Sports Association
28 East Cleveland Ave.
Newark, Del 19711
(302) 368-9990

Micro Power and Light
12820 Hillcrest Rd., Ste. 219
Dallas, TX 75230
(214) 239-6620

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225 Westchester Ave.
Port Chester, NY 10573
(914) 937-5440

MicroPro International Corp.
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San Rafael, CA 94707
(415) 499-1200 (For Pub)
(415) 499-4027

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Hunt Valley, MD 21031
(301) 667-1151

Microsoft Corp.
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P.O. Box 97200
Bellevue, WA 98009
(800) 426-9400

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45 Winthrot St.
Concord, MA 01742
(617) 371-1660

Mind Systems Corp.
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Northampton, MA 01061

MindPlay
82 Montvale Ave.
Stoneham, MA 02180
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Northbrook, IL 60062
(312)480-7667

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St. Louis, MO 63132-0579
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Corvallis, OR 97333
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(314) 635-9459 nights

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Origin Systems, Inc.
340 Harvey
Manchester, NH 03103
(603) 644-3360

Overdrive Computer Corp.
1562 Moorings Dr.
Reston, VA 22090
(703) 471-0959

Paladin
2895 Zanker Road
San Jose, CA 95134
(408) 946-6077

PeachTree Software, Inc.
3445 PeachTree Rd., N.E.
Atlanta, GA 30326
(404) 239-3000

Penguin Software
830 Fourth Ave.
P.O. Box 311
Geneva, IL 60134
(312) 232-1984

Penton Software, Inc. (PSI)
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New York, NY 10017
(212) 878-9626

Peregrine
2041 Chamberlain Ave.
Madison, WI 53705
(608) 238-4875

Peripheral Visions
5285 Elam Young Pkwy., Ste. B400
Hillsboro, OR 97124
(503) 640-1317

Phoenix Software
see American Eagle Software

Plain Vanilla Software
33728 Terra Circle
Corvallis, OR 97333
(503) 752-1834

Powersoft
312 S. Los Angeles, St.
Los Angeles, CA 90013
(213) 687-9530

Pratt Medical Group
Division of Clinical Decision Making
171 Harrison Ave.
Boston, MA 02111
(617) 956-5910

Professor, The
959 N. W. 53rd St.
Fort Lauderdale, Fl 33309
(305) 771-6498

ProForma Software
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Costa Mesa, CA 92626
(714) 641-3846

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635 S. Sanborn Rd., Ste. 22
Salinas, CA 93901
(408) 757-0125

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Great Valley Parkway
Malvern, PA 19355
(800) 441-1003

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Portland, OR 97212-8137
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Chatsworth, CA 91311
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Denver, CO 80219
(303) 934-2211

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Lexington, MA 02173

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Seminole, FL 33543
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5004 Glen Forest Dr.
Raleigh, NC 27612

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New York, NY 10106
(212) 541-8024

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2331 Gus Thomasson, Ste. 125
P.O. Box 280300
Dallas, TX 75228
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Scarborough Systems, Inc.
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Tarrytown, NY 10591
(914) 332-4545

Scholastic, Inc.
730 Broadway
New York, NY 10003
(800) 505-3000

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Des Plaines, IL 60018
(800) 334-5470

Sega Enterprises
see Simon & Schuster

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Minneapolis, MN 55410
(612) 929-7104

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616 Pinetree Dr.
Fort Wayne, IN 46819
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San Antonio, TX 78240
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3639 New Getwell Rd. Ste. 10
Memphis, TN 38118
(901) 683-6850
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Cambridge, MA 02139
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Champaign, IL 61820
(217) 359-8482

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Superex International Marketing
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Swearingen Software
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Crenston, RI 02920
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Vancouver, B.C. V6H 3V9
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(604) 734-8822

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Renton, WA 98055
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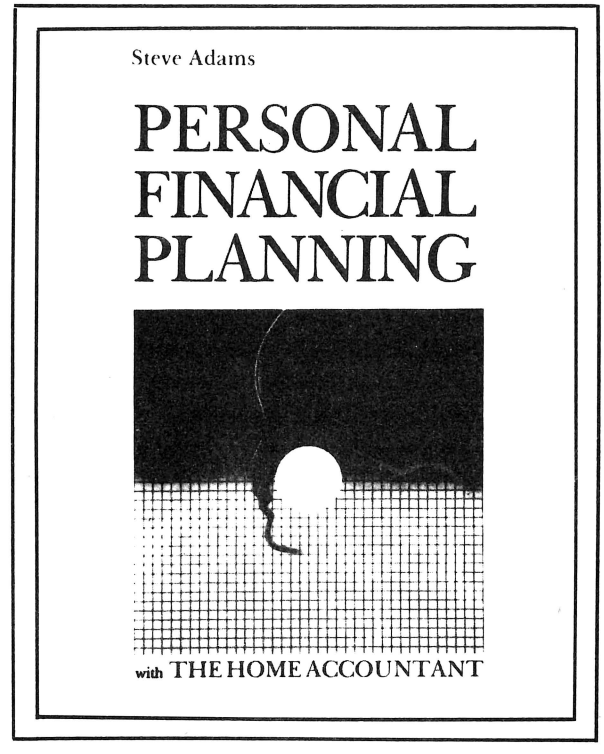

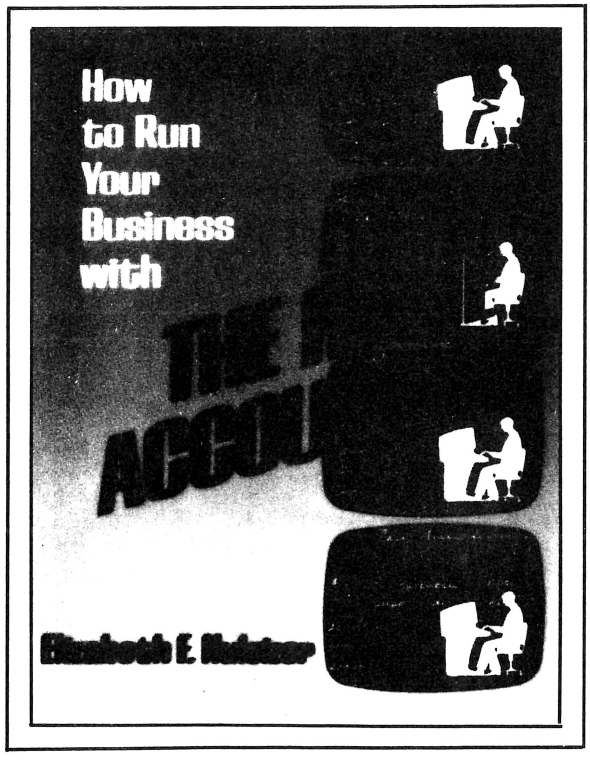

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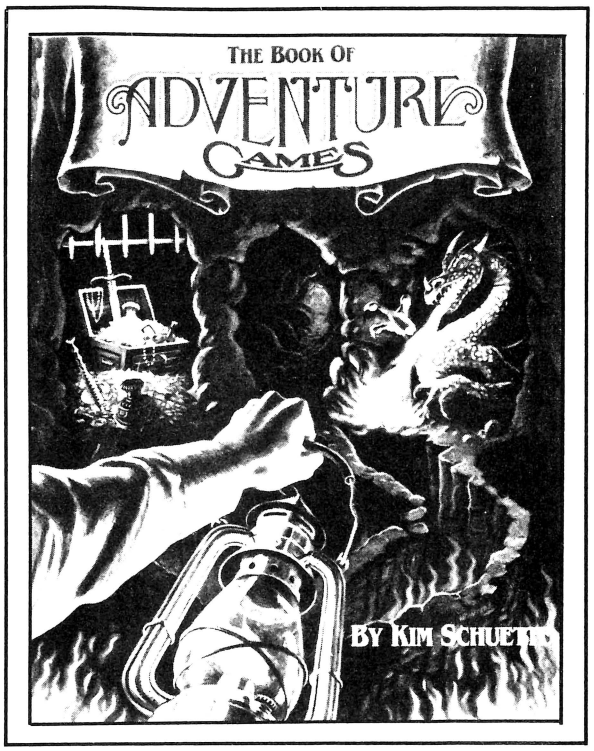

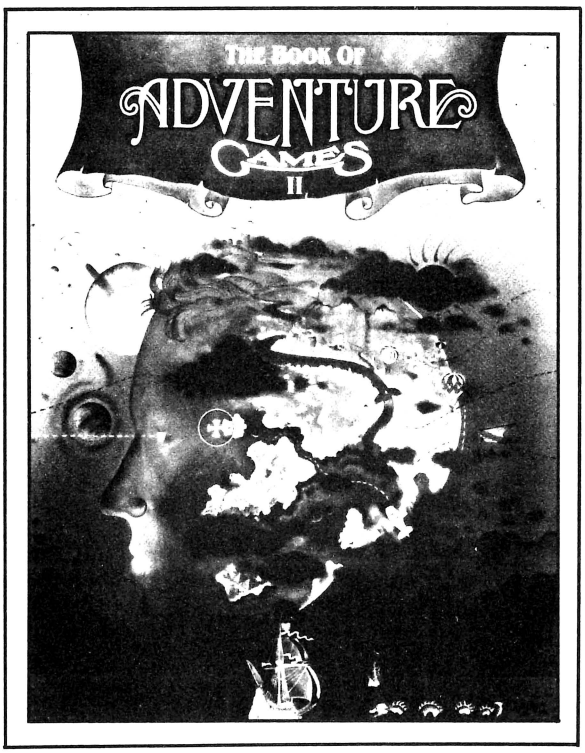

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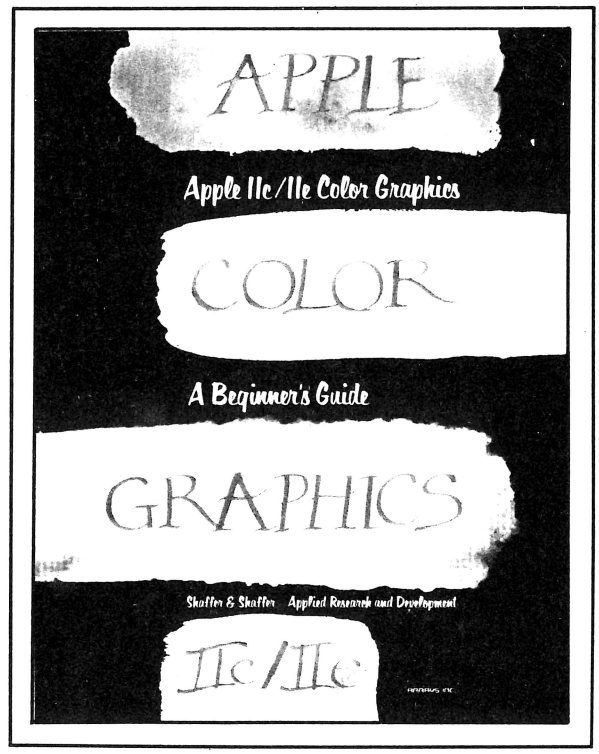

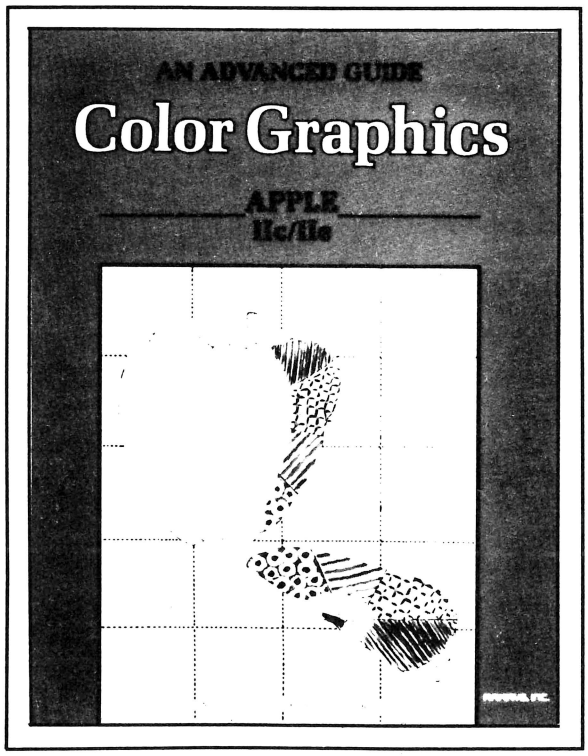

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   5-10 hours ____ 20+ hours ____
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